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Platform News and Information

***** Check out our Platforms, Technologies, and Events pages *****

Every month we cover the latest developments in platform initiatives and technologies. Our "Platforms" pages provide news on the latest trends and initiatives for the business, home, mobile, server and workstation platforms. Our "Technologies" pages give you quick and detailed information on the industry status of specific platform technologies, from the emergence of the Accelerated Graphics Port (AGP) to the latest advances in Intel microprocessors, memory, Audio, USB, 1394, DVD, Power Management, and PC 98. Our "Industry Events" page keeps you up to date on upcoming industry gatherings targeted at the platform and peripheral developer.

Technology News

This department is your source for the hottest technology and product announcements, white papers, design guides, specifications, tools and developer events available to the industry.

- **DMI 2.0 Nominated** for Technology of the Year
(<http://developer.intel.com/solutions/tech/xtra/news.htm>)
- Intel enables production of **Affordable, Easy-to-Use, PC Cameras**
(<http://developer.intel.com/design/imaging/kit.htm>)
- **New H/W Design Guide** for Windows*NT Server available for Download
(<http://www.intel.com/procs/servers/resource/index.htm>)
- Intel & SPA provide **New DVD white papers** for MCI to DirectShow*
(<http://developer.intel.com/solutions/tech/dvd.htm>)
- **New Mobile Processors** Bring MMX™ Technology to Mini-Notebooks
(<http://www.intel.com/pressroom/archive/releases/MP102097.HTM>)
- Backgrounder on **IA-64 & EPIC Technology** from the Microprocessor Forum
(<http://www.intel.com/pressroom/archive/backgrnd/sp101497.HTM>)
- New **Pentium II Processor Developer's Manual** available for Download
(<http://developer.intel.com/design/PentiumII/manuals/243502.htm>)
- Presentations from Intel's "**H.323 Everywhere**" seminar at TeleCon* XVII - New white paper on "**Measuring Quality in Video Conferencing Systems**"
(<http://www.intel.com/proshare/Conferencing/news/TELECON.HTM>)
- New **USB Hub Controllers** and Design/Validation Solutions Launched
(<http://www.intel.com/pressroom/archive/releases/US111097.HTM>)

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<http://developer.intel.com/solutions/>

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On behalf of all of us at Platform Solutions, welcome to the future of the PC platform!

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Feature:

Enabling Platforms for the Enterprise, Small Business, and Consumers

by Mike Aymar

Vice President and General Manager
Intel Corporation, Desktop Products Group

Being the computer industry's premier tradeshow, Fall Comdex is usually a good place to find out what opportunities are in store for the computer industry as a whole. By visiting the Intel exhibit area, located in room LN109 of the Las Vegas Convention Center, the industry can get a feel for Intel's efforts at enabling Intel Architecture based platforms across three major market segments: Enterprise (or large business customers), Small Business, and Consumer markets.

The common thread across each of these segments is that the Pentium® II processor provides the power that all computer users need. Whether it's an Enterprise IT manager specifying high-performance Servers to run a company-wide, fully managed, rich e-mail system, or a Small Business embarking on a new way to grow their business through the Internet, or a Consumer taking full advantage of the PC for creating, enhancing, and sharing photographs—the Pentium II processor provides new capabilities that not only change the usage model but change the computing landscape in each one of these growing segments.

Comdex will show that Intel has focused its efforts to enable the industry with platforms, technologies, and product building blocks that deliver the full potential of the Pentium II processor. From Intel's Wired for Management initiative and web-enabled business initiative for the Enterprise, to host-based DVD playback and PC Camera solutions for consumer entertainment and creativity, Intel's Comdex demos show that these technologies and building blocks are here today. Intel is also introducing new programs with the Small Business channel to enable businesses of all sizes to utilize the power of the Pentium II processor coupled with the Internet.

Whether you're going to Comdex or not, you can read more about the solutions Intel is enabling in the Top Stories of this month's Platform Solutions newsletter. These articles will show the great opportunity the industry has to deliver the computing power of the Pentium II processor to the Enterprise, Small Business, and Consumer marketplaces. The other departments of Platform Solutions are a great place to stay on top of the technologies Intel is enabling for the cresting wave of the Pentium II processor in 1998.

About the Author

Mike Aymar is Vice President and General Manager of Intel's Desktop Products Group. Mike is responsible for all of Intel's desktop products, platforms and technologies.

For More Information

Read the articles in this month's issue of Platform Solutions that elaborate on Intel's Comdex demos and describe Intel's platform enabling focus:

Enterprise Platforms: Delivering Pentium II Processor Power

An overview by Will Swope, Intel Vice President of Business Client Marketing, of Intel's platform initiatives for Web-enabled business & communications, manageability, server technology and workstation performance. (<http://developer.intel.com/solutions/issue/stories/top1.htm>)

Small Business Platforms: Getting Connected

Willy Agatstein, Intel's Director of Small Business Marketing, shows that Intel is working with the Small Business channel to enable the power of Pentium II processor platforms for business on the Internet. (<http://developer.intel.com/solutions/issue/stories/top2.htm>)

Power to Change Consumer PC Usage Models

Intel Vice President of Consumer Desktop Products, John Davies, describes how the Pentium II processor is changing the usage of the consumer PC platform for creativity, entertainment, and education.

(<http://developer.intel.com/solutions/issue/stories/top3.htm>)

Visit Intel's Comdex Web site to get all the details of Intel's Comdex Activities.

(<http://www.intel.com/intel/comdex97/index.htm>)

Top Stories:

Enterprise Platforms: Delivering Pentium[®] II Processor Power

by Will Swope

Vice President, Business Client Marketing
Intel Corporation, Desktop Products Group

The powerful combination of the Pentium[®] II processor and a number of broad-based platform initiatives, technologies and building blocks are propelling enterprise computing into a world of new possibilities. For OEMs and IHVs, that translates into a wealth of product development and business opportunities.

From Web-enabled business and corporate intranets to the emergence of workstation-class visual computing, today's business enterprises are entering an era of exciting new applications. One thing all of these applications have in common is a need for robust compute performance to fulfill their potential.

The Pentium II processor provides the advanced level of performance that will allow enterprise computing to take the next step forward in enabling large organizations to be more productive and efficient. But the microprocessor at the core of this change is just part of the story. Equally important to product developers and enterprise IT professionals are the emerging technologies and standards driving the evolution of the computing platform as a whole. Intel is driving a number of industry-wide platform initiatives and technologies, many of which are focused on the needs of next-generation enterprise computing.

Enabling the Enterprise

At Comdex Intel is featuring demos that expand on the concepts of four areas of significance in enterprise computing: Web-enabled business & communications, manageability, server technology and workstation performance. Each area represents a prime opportunity to utilize the performance of the Pentium II processor with today's evolving platform technologies and standards:

- ***Web-Enabled Business & Communications***

The Pentium II processor is enabling large enterprises to realize the many benefits of conducting business over the Internet. Today's increasingly robust Internet applications, such as multimedia Web content creation and publishing or 3D electronic commerce applications utilizing host-based DVD playback, all require the advanced computing power that Pentium II processor based platforms deliver. Opportunities for IHVs and OEMs abound in the mobile computing arena, as well. Intel processor-based mobile systems equipped with video conferencing, multimedia e-mail and wireless connectivity will lead to better organizational performance and improved productivity for employees on the road. (For more information on Mobile platform power management, manageability and mobile data initiatives being driven by Intel, visit the [Mobile Platforms page](http://developer.intel.com/solutions/platfms/mobile.htm)—
<http://developer.intel.com/solutions/platfms/mobile.htm>).

Another important element of the Web-enabled business initiative includes the integration of the Java[®] programming language within the enterprise. The Intel Architecture (IA) allows developers to take advantage of Java as an application development tool. It provides a greater assortment of Java development tools than any other platform architecture, while delivering higher performance for Java applications and applets. Equally significant, Java runs seamlessly with existing applications on the Intel Architecture, providing security and safety for large business enterprises. (For more information on IA and Java please visit the [IA and Java web page](http://www.intel.com/businesscomputing/archive/tech3.htm)—
<http://www.intel.com/businesscomputing/archive/tech3.htm>)

- **Manageability**

As enterprise computing grows in complexity, ways need to be found to make all PCs and servers easier to manage. Intel has been a key player in driving the Wired for Management (WfM) initiative, a broad-based industry effort to integrate all of the pieces of the enterprise architecture in a way that provides greater control and manageability for IT professionals to reduce the total cost of ownership for their organizations.

Key components of the WfM initiative (<http://developer.intel.com/solutions/tech/wfm.htm>) include the adoption of the WfM Baseline specification and the evolution of the Network PC (Net PC) (<http://developer.intel.com/solutions/tech/netpc.htm>), both areas in which Intel has worked closely with companies such as Microsoft*, Compaq*, Hewlett-Packard* and Dell*. The WfM Baseline specification establishes a set of management interfaces designed to enable such capabilities as remote configuration and installation of operating systems and applications, remote control and diagnostics, and after-hours maintenance. The Network PC System Design Guideline defines a new category of business PCs designed from the ground up to be centrally managed while also delivering the power and versatility of an advanced business desktop computer.

- **Server Technology**

Much will be expected from enterprise servers running next generation networking applications. Some examples of these are rich media delivery, streaming video, and multimedia e-mail capacities capable of serving hundreds of thousands of users. Larger businesses can take advantage of the outstanding performance Pentium II processor-based servers provide for hosting departments, work groups and intranets. Intel is working with OEMs, IHVs and the industry as a whole to enable the development of Pentium II processor-based servers for the enterprise.

Intel is focused on four technology areas to further advance the Standard High-Volume (SHV) server platform: Scalability through the Virtual Interface (VI) architecture, Manageability through the WfM initiative, I/O performance through I₂O[®] technology, and Flexibility through industry-standard building block modules. In early October, Intel and industry server leaders unveiled the first Intel-based servers with I₂O[®] technology and Intel I/O processors bringing improved I/O scalability, better I/O channel management and enhanced I/O interoperability to enterprise customers. (For more information on Server platform technologies, please visit the Server Platforms page - <http://developer.intel.com/solutions/platfms/server.htm>).

- **Workstation Performance**

Powerful Pentium II processor-based enterprise computers are now capable of delivering advanced workstation performance while also providing all the compatibility and interoperability advantages of the Intel Architecture. Take the case of visual computing, which utilizes platform innovations delivered by the Pentium II processor, such as the increased system bandwidth of the Dual Independent Bus (DIB) architecture, and Accelerated Graphics Port (AGP) technology (<http://developer.intel.com/solutions/tech/agp.htm>). These developments are opening the door for OEMs and IHVs to provide the high-performance 3D graphics, video processing, and digital imaging capabilities of Visual Computing (<http://developer.intel.com/solutions/archive/issue1/focus>) to enterprise customers in affordable and compatible ways that were never before possible. (For more information on Intel Architecture workstation platform developments, please visit the Workstation Platforms page—<http://developer.intel.com/solutions/platfms/workstat.htm>).

Enterprising Opportunities

Intel continues to set the pace in advancing the frontiers of platform technologies that will help the industry and their enterprise customers benefit from ever-increasing levels of microprocessor performance. OEMs and IHVs in particular can use this platform knowledge and technology building blocks to better meet the needs of their enterprise customers as they develop their next-generation hardware and software solutions.

About the Author

Will Swope is a Vice President in Intel's Desktop Products Group. As head of Business Desktop Marketing, he is responsible for planning and marketing Intel's complete line of business client products.

For More Information

For more information about Intel's enterprise demos at Comdex, please visit Intel's special Comdex Web site (<http://www.intel.com/intel/comdex97/index.htm>).

To stay informed about Intel's platform initiatives and technologies targeted at the Enterprise market, please visit the Business, Mobile, Server, and Workstation Platform pages in Platform Solutions on a monthly basis.

Small Business Platforms: Getting Connected

by Willy Agatstein

Director, Small Business Marketing
Intel Corporation, Desktop Products Group

Intel's Pentium[®] II processor provides the power and performance that small businesses need to grow and compete more effectively. Demos at Intel's Comdex booth reveal how OEMs and IHVs can tailor their products to meet the needs of small business, which now represents one of the fastest growing segments of the computer marketplace.

According to some estimates, small businesses—defined as companies with less than 100 employees—now comprise more than one-third of the marketplace for computer products. These smaller companies need to continually find ways to be more productive, compete more effectively and improve their communications.

The small business marketplace shares a common need for advanced processor performance across today's and tomorrow's computing platforms—the kind of unique performance and power offered by the Intel Pentium II processor. As the essential building block for small business desktop and server systems, it provides outstanding software compatibility, along with the performance headroom required to meet the needs of the next generation of small business applications.

In recognition of the growing influence of small companies on the computing landscape, Intel is focusing on enabling the development of small business products based upon the Pentium II processor. To drive these efforts, Intel is also developing a variety of programs for channels that serve the needs of small business.

Getting Connected

Connectivity is the best way to put today's technology to work for small businesses. First of all, modern computing provides the power to improve communications by using the Internet to better serve local markets and stay in closer contact with suppliers. In addition, the evolution of server technology and "line-of-business" applications provides new ways to manage the operations of a small company.

Intel's platform enabling efforts are targeted toward the small business desktop, a flexible Pentium II processor-based PC that empowers small companies to better manage their business, improve communications and compete more effectively. The small business desktop flexible PC, which can exist as a standalone PC or be linked to a shared network, includes such capabilities as an integrated CD/DVD, modem, backup capabilities, and a network interface card.

The evolution of flexible PC usage is moving various peripherals such as printers to the network, resulting in lower costs, better manageability and easier upgradability. Complementary products of interest to OEMs and IHVs include small business network solutions and entry-level servers.

Industry Alliances

Along with its product enabling efforts and channel programs, Intel is demonstrating its leadership by developing small business industry alliances. These alliances will include members of the OEM and IHV community, working together to help develop solutions that meet the needs of what has become a large and rapidly growing segment of the computing marketplace. Contact your Intel account representative to learn more about Intel's small business programs.

About the Author

Willy Agatstein is Director of Small Business Marketing with Intel's Desktop Products Group. He is responsible for developing worldwide marketing programs to accelerate the adoption of Intel technology into the small business market segment.

For More Information

Additional information about Intel's demos that will be featured at Comdex can be found at Intel's special Comdex Web site (<http://www.intel.com/intel/comdex97/index.htm>).

Intel's on-line Comdex "Compass" highlights other companies featuring small business technologies at the show. (<http://www.intel.com/businesscomputing/small/compass>)

Intel has also launched a small business Web site to educate end users about the benefits of computing technology. (<http://www.intel.com/businesscomputing/small>)

To stay informed about the technologies driving the business platform, stay tuned to the Business Platforms page in Platform Solutions. (<http://developer.intel.com/solutions/platfms/business.htm>)

Power to Change Consumer PC Usage Models

by John Davies

Vice President and Director of Consumer Desktop Products
Intel Corporation, Desktop Products Group

New PCs based on the Pentium[®] II processor with Dual Independent Bus architecture are now reaching the consumer market at mainstream price points. These new platforms are making unprecedented power affordable to more PC consumers than ever before. For the first time new PC experiences such as DVD-based interactive software titles, DVD movies, video editing, high-performance 3D graphics and animation, PC photography and consumer electronics-quality audio are within the reach of a wide cross-section of consumers in homes and schools.

These exciting new Pentium II processor-based platforms are more than simply fun and useful PCs at very attractive prices. They reflect Intel's commitment to drive the new capabilities of Visual Computing (<http://developer.intel.com/solutions/archive/issue1/focus.htm>) to the PC platform changing the way consumers work, learn, and play. At Comdex, you will see platforms which define profound new usage models for the PC—including new power for entertainment, creativity and education.

Power for Entertainment

The Entertaining PC usage model involves new entertainment applications and the convergence of the PC platform with consumer electronics devices. This is a trend that is being driven by dramatic improvements in 3D graphics through the Pentium II processor and Accelerated Graphics Port (AGP), consumer electronics-quality (AC '97) audio and host-based DVD (MPEG2) video processing. DVD, a term which many consumers already recognize, is beginning to become available on the current generation of Pentium II processor based PCs for new interactive software titles and movies. During 1998, host-based DVD processing (<http://developer.intel.com/solutions/issue/stories/top5.htm>) will become a key element of Pentium II processor-based Entertaining PCs at mainstream consumer price points.

In addition, PCs with the Pentium II processor and AGP technology are creating a dramatic step forward in 3D realism for game enthusiasts. These platforms are capable of generating realistic 3D animations with high frame rates, high resolutions and rich textures to support compelling new experiences for near arcade-quality multiplayer gaming experiences.

Universal Serial Bus (USB) (<http://developer.intel.com/solutions/tech/usb.htm>) and IEEE 1394 (<http://developer.intel.com/solutions/tech/1394.htm>) are complementary "outside the box" Plug and Play PC connectivity technologies that play an important role in the new Entertaining PC usage model. USB permits the flexible connection of speakers, monitors and gaming I/O devices, while 1394 provides an equally flexible, higher-speed connection to video devices and consumer electronics products.

Power for Creativity

The Creativity PC usage model enables consumers to manipulate audio, music, photos, video and 3D content to create and share their life experiences with family and friends. Children's sports, family outings, artistic hobbies and amateur music are just a few of the personal experiences the Creativity PC can capture and enhance. It also helps consumers improve household productivity in many areas such as parent-teacher communication, kid's homework, fashion guidance, and even home or car sales.

The Creativity PC takes advantage of the power of the Pentium II processor for digital imaging, video editing, audio/music, Web content creation, and screen-to-screen communication. The PC is the perfect vehicle for enhancing, storing and sharing images from a variety of sources, including portable PC cameras, video cameras and conventional scanners. Intel's Create & Share[™] Camera Pack and Video Phone with ProShare[™] software enable users to share their digital images and ideas with other users via screen-to-screen Internet and e-mail applications. Intel is playing a central role in this usage model by providing the Portable PC Camera '98 Design Guideline to the industry, and by its recent announcement

of the [971 PC Camera Kit](http://developer.intel.com/solutions/stories/top4.htm) (<http://developer.intel.com/solutions/stories/top4.htm>) designed to enable the fast time-to-market development of easy-to-use and affordable PC cameras. PC imaging and PC video telephony applications are another key application for USB connectivity, providing a fast and easy way to get digital image data from peripherals into the PC.

Thanks to emerging home creativity software applications, 3D Web sites with integrated audio and smooth video animation are becoming a reality for home PC users. In addition, the Pentium II processor empowers consumers to perform real-time video editing with fast compression and smooth transitions. Making home movies on a Pentium II processor based PC is both fun and easy. Video-in and video-out connections on the front panels of selected Home PC models are available from major PC manufacturers today.

Power for Education

The Education usage model views the PC as a powerful complementor to the traditional learning process, making the educational experience more interesting, interactive and fun for students of all ages. Intel shares the view that improving the quality of education for children should be an imperative for every culture throughout the world.

Today's new Pentium II processor based systems are creating the hardware headroom which will enable the emergence of powerful new 3D graphics education software applications during 1998. Fast bitmap animation, fast intuitive interfaces, and reference works containing detailed 3D simulations with smooth video and high-quality audio all have the power to transform education for children. These compelling learning tools will be enhanced further as DVD-based interactive software titles become available in increasing numbers in 1998. Most importantly, these new systems will not only support compelling teaching and learning applications for children around the world, these powerful new PCs will become increasingly affordable for use in schools.

Making the power affordable for consumers

Enhancing the PC experience and enabling new uses for consumers of all ages is a major goal at Intel. New PC platform technologies, such as the Pentium II processor, AGP, DVD, AC'97 Audio and USB, are changing the role of the personal computer in everyday life. This year's Fall Comdex will showcase many of these new systems and the emerging usage models which are changing the ways people relate to their PCs.

The most exciting news is that many of these Pentium II processor-based systems are already available to consumers at retail price points around \$2,000. This means that new dimensions of entertainment, creativity and learning are now affordable to new generations of PC users.

About the Author

John Davies is Vice President and Director of Consumer Desktop Products for Intel's Desktop Products Group. He is responsible for the planning, development, and marketing of desktop platform products and technologies.

For More Information

For more information on Intel's Creativity PC initiative, please visit the [Creativity PC technology page](http://developer.intel.com/solutions/tech/creapc.thm) in Platform Solutions. (<http://developer.intel.com/solutions/tech/creapc.thm>)

Check out two related Top Stories in this month's issue of Platform Solutions [on Host-Based DVD Processing](http://developer.intel.com/solutions/issue/stories/top5.htm) (<http://developer.intel.com/solutions/issue/stories/top5.htm>), and [PC Cameras](http://developer.intel.com/solutions/issue/stories/top4.htm) (<http://developer.intel.com/solutions/issue/stories/top4.htm>).

For more information on all of the key platform technologies driving the Consumer PC platform, visit the [Home Platforms page](http://developer.intel.com/solutions/platfms/consumer.htm) (<http://developer.intel.com/solutions/platfms/consumer.htm>) and the technology pages in Platform Solutions on DVD, AGP, Audio, USB, and 1394.

PC Cameras Make Picture-Perfect Solutions

by Peter Green

General Manager, Digital Peripherals Division
Intel Corporation, Computing Enhancement Group

The market for digital cameras is exploding, with more cameras available from more manufacturers than ever before. While consumer interest in these products is reaching an all-time high, so are customer return rates. Clearly, consumers want digital cameras that work well with their PCs and available software. Consumer expectations are heightened by current retail price points for digital cameras, which currently average around \$400 to \$500. It has become clear that digital cameras will not achieve widespread consumer acceptance unless they can be made easier to use, more reliable and at the same time more affordable.

Intel's vision: the digital camera as PC peripheral

Current digital cameras are complex standalone devices, that contain all the necessary silicon and software to capture an image, convert it to digital, interpolate, then compress and store it for transfer to the PC. This overhead can not only make the camera relatively costly, but can also make getting those images into the PC in a desired format an overly complex process.

Intel has worked with leading computer and imaging companies to address these problems through the Portable PC Camera '98 Design Guideline (<http://www.intel.com/imaging/trends/guidelin.htm>). The goal of the effort is to make PC imaging as simple as possible for the average user. The guideline offers guidance to companies on how to tackle issues including file formats, connectivity with the PC, and how to take advantage of the processing power of the PC itself.

The guideline also envisions the portable PC Camera as a true PC peripheral, designed primarily for image capture and relying on the processing power of the PC with Pentium® II processor to enhance, store and share images. Moving image processing overhead off the camera to the powerful processing and storage environment of the PC enables the quick time-to-market development of simpler, more affordable, easier-to-use PC Cameras.

Introducing the Intel 971 PC Camera Kit

To make PC cameras easier to manufacture, easier to use and more affordable, Intel has introduced the 971 PC Camera Kit. The kit includes a high-quality CMOS image sensor capable of 768x576 maximum pixel resolution and 16.7 million colors in 24-bit mode. In addition, the camera includes a precision integrated optical assembly, integrated Flash Memory in Miniature Card form factor modules, with flexible connectivity features and built-in strobe.

The 971 PC Camera Kit makes it easy and cost effective to design to the Portable PC Camera '98 Guideline and produce a simple, easy-to-use camera that can retail for less than \$300, making it an "impulse buy" for many consumers. The camera functions as a dual-mode image capture peripheral, working while connected to the PC for video telephony applications or carried away from the PC as a portable camera for still image capture. In connected mode, the camera supports a Universal Serial Bus (USB) connection (<http://developer.intel.com/solutions/tech/usb.htm>) which permits the fast download of still image data from the camera to the PC.

Interoperability

The 971 PC Camera Kit supports the FlashPix* image file format endorsed by leading PC and imaging companies. The FlashPix format is intended to deliver a high level of interoperability of image files among software applications by offering multiple resolutions, compression and color scale management. In addition to making cameras easier to use, the FlashPix large file is used directly with software applications such as Microsoft PictureIt!.*.

The camera for the Creativity PC

The ability to capture, create and share PC images has kindled the imaginations of photo enthusiasts and PC consumers. Creativity in images, documents and web sites is important to users. Intel is working to meet consumer expectations through the image processing power of the Pentium® II processor, now available in mainstream PCs. The 971 PC Camera Kit completes the picture with a comprehensive reference design that includes Intel's CMOS image sensor, microcontroller-based image processing unit, Intel PC camera manager utility software, design documentation and a set of suggested manufacturing procedures.

Available in 1998 through independent manufacturers

Developers interested in meeting consumer demand for simple, interoperable and competitively priced PC Cameras in 1998 should contact one of three manufacturers planning to produce cameras based on the 971 PC Camera Kit. These manufacturers include Aztech Systems*, Lite-On Technology Corporation*, and Samsung Aerospace Industries, Ltd.*

New ways to capture and share images

By increasing reliability and consumer acceptance, simpler and more affordable cameras based on the 971 PC Camera Kit can help to brighten the digital imaging picture even further in 1998. The growth of the Internet provides many new ways for home and small business PC users to share digital images screen-to-screen. Personal web sites, photo-enhanced e-mail, electronic greeting cards and video telephony applications are just some of the fun and rewarding ways PC users can enjoy digital imaging. The Pentium® II processor-based PCs now arriving on the market, together with user-friendly imaging software and increasingly affordable photo-quality printers, have the power to make imaging a powerful extension of the evolving PC usage model. The emergence of more affordable and reliable PC camera peripherals will make the picture complete.

About the Author

Peter Green is the General Manager of the Digital Peripherals Division of Intel's Computing Enhancement Group. A 14-year veteran of Intel, Peter is the focal point for Digital Imaging activities at the company.

For More Information

More information is available on Intel's PC Imaging Web site for developers, (<http://developer.intel.com/design/imaging>) including:

- information on Intel's 971 PC Camera Kit (<http://developer.intel.com/design/imaging/kit.htm>)
- information on how to design with Intel's 971 PC Camera Kit (<http://developer.intel.com/design/imaging/design.htm>)
- information on Intel's PC Imaging Initiative (<http://www.intel.com/imaging>)

For more information on Intel's Creativity PC initiative, please visit the Creativity PC technology page in Platform Solutions_ (<http://developer.intel.com/solutions/tech/creapc.htm>)

Check out a related story in this month's issue of Platform Solutions, "Power to Change Consumer PC Usage Models", by Intel Vice President of Consumer Desktop Products, John Davies. (<http://developer.intel.com/solutions/issue/top3.htm>)

Host-based DVD: Arriving on PC Platforms Today

by Rajesh Shakkarwar

DVD Technology Development Manager
Intel Corporation, Desktop Products Group

The multimedia PC growth phenomenon of 1994 was driven by a perfect match of two new technologies: the Pentium® processor and CD-ROM technology. History is getting ready to repeat itself in 1998 with the Pentium II processor and host-based DVD technology delivering Visual Computing capabilities (<http://developer.intel.com/solutions/archive/issue1/focus.htm>).

DVD discs have the same form factor as CD-ROMs, but offer at least seven times the data capacity and much more value. DVD technology utilizes MPEG-2 video and AC-3/MPEG audio encoding to deliver studio quality video and digital audio. The video and audio data can be a part of linear playback or interactive games.

DVD discs come in five different formats. While CE players can play only the DVD-Video format, PC-based DVD players are capable of playing all formats, thus supporting a broader array of applications, including interactive titles, archiving, and DVD movies—as well as your old CD-ROM and CD-Audio titles.

Host-Based DVD

Besides playing all DVD formats, PC-based DVD players offer sophisticated interactivity through multiple I/O devices (joysticks, mice, keyboards, etc.), support Internet connectivity for hybrid applications, and provide easy hardware or software upgradability. PC-based DVD players can be implemented with either fixed-function hardware or host-based software. Add-in hardware adds cost, whereas the host-based software solution uses the power of the Pentium II processor for DVD playback offering the best value to end users.

Decoding of MPEG2 video and AC-3/MPEG audio streams, along with CSS descrambling for copy protection, is very compute intensive and requires extensive data movement. This task can be accomplished in software through a balanced platform utilizing the power of the Pentium II processor with its MMX™ technology and Dual Independent Bus architecture, the high memory bandwidth provided by AGP technology (<http://developer.intel.com/solutions/tech/agp.htm>), a good graphics subsystem supporting video features such as quality up/down-scaling, pan-scan, and field deinterlacing, and an audio subsystem with PCI or Type-F DMA support.

Shipping Today—Mainstream In '98

Intel has been leading the industry in development of DVD technology. For over two years Intel has played a key role in making the technology viable through its work with the motion picture, consumer electronics and PC industries. As a result of Intel's efforts, host-based DVD PCs with Pentium II processors are shipping today from Compaq* and Hewlett-Packard*. By the second half of 1998, consumers will be able to purchase powerful host-based DVD PC platforms at mainstream price points.

Content—Here And Growing

These platforms will be able to play the hundreds of movie and interactive software titles arriving on the market today. All of the top movie studios are committed to DVD, and most will release titles simultaneously with release on VHS. Over 150 movie titles are shipping today with more than 350 titles expected by the end of 1997.

The introduction of creative interactive software titles will help fuel DVD growth on the PC. More than 25 interactive software titles are shipping now with over 50 titles expected by the end of '97. A few hot titles available today include Muppets Treasure Island*, Wing Commander IV*, Billboard Music Guide*,

Warren Miller Ski World*, and Blockbuster Guide to the Movies*. Over 100 new interactive titles are also currently in development.

The increasing availability of rich and varied content of movies and interactive titles will be a key driving force in the success of host-based DVD. Intel is working closely with the ISV and movie industries on software compatibility and title development.

Intel's Commitment To DVD Success

Intel is committed to helping the industry deliver DVD as a core element of the mainstream PC platform by the second half of 1998. Here's a closer look at Intel's involvement with OEMs, IHVs, ISVs, and the motion picture industry to help broaden DVD diffusion.

- Intel is working with the Copy Protection Technical Working Group (CPTWG) on copy protection methodologies.
- At the CAA Lab in Hollywood and its Hybrid Authoring Studio in Oregon, Intel provides assistance to software developers and content providers in DVD title development.
- Intel and the Software Publishers Association are working together to assure cross-platform compatibility of DVD titles. They jointly hosted the [DVD Developers Conference](http://www.intel.com/pressroom/archive/releases/IV102997.HTM) on October 29, 1997, to provide content developers with a common set of MCI commands for title development. (<http://www.intel.com/pressroom/archive/releases/IV102997.HTM>)
- At the Intel Developer Forum on September 29, 1997, Intel provided OEM platform developers and IHVs with the technical information and training necessary to implement successful host-based DVD designs.

Staying Ahead Of The Curve

PC platforms with the power of the Pentium II processor will make host-based DVD a centerpiece of mainstream PCs in 1998. OEM platform developers can help assure that DVD achieves its full potential by focusing on host-based DVD designs. At the same time, IHVs can help make sure their products support all the required features, and content providers can develop compelling new DVD titles. This way the entire industry can benefit from the Pentium II processor and DVD market growth phenomenon that is on the horizon today.

About the Author

Rajesh Shakkarwar is DVD Technology Development Manager at Intel. He is responsible for industry-wide enabling of DVD solutions on PC platforms.

For More Information

To continue to get the latest updates on host-based DVD, stay tuned to the [DVD Technology](http://developer.intel.com/solutions/tech/dvd.htm) page in Platform Solutions. There you will find the latest news and resources for DVD development, as well as links to other DVD information sources throughout the industry. (<http://developer.intel.com/solutions/tech/dvd.htm>)

Read the related Top Story in this month's Platform Solutions by John Davies, Intel Vice President of Consumer Desktop Products, on ["Power to Change Consumer PC Usage Models"](http://developer.intel.com/solutions/issue/stories/top3.htm). (<http://developer.intel.com/solutions/issue/stories/top3.htm>)

Platforms:

Business Platforms

What's New

- Intel showcases **platforms for the Enterprise** at Fall Comdex. Intel's Vice President of Business Client Marketing, Will Swope, gives an overview of Intel's Enterprise platform enabling efforts in this month's issue of Platform Solutions.
(<http://developer.intel.com/solutions/issue/stories/top1.htm>)
- Desktop Management Interface version 2.0 (**DMI 2.0**) nominated for PC Magazine's **Technical Excellence Award**. Winners to be announced at Comdex.
(<http://developer.intel.com/solutions/tech/xtra/news.htm>)
- Intel Shows Paths to **Competitive Business Computing at Networld+Interop**
(<http://www.intel.com/pressroom/archive/releases/nw100797.HTM>)
- Intel announces availability of **LANDesk® Client Manager v3.1** to Lower Costs with Wired for Management Support
(<http://www.intel.com/pressroom/archive/releases/LD092997.HTM>)
- **PC Industry Delivers on Manageability**—Wired for Management and Net PC Interoperability event shows momentum of WfM
(<http://www.intel.com/pressroom/archive/releases/WM092997.HTM>)
- Compaq* and Hewlett-Packard* unveiled **new systems based on Intel's WfM specification**
(<http://www.techweb.com/crn/dailies/weekending100397/sept29digJ.html>)
- Intel updates **Wired for Management ToolKit** with latest WfM Building Blocks including a New WfM Design Guide to help Developers implement WfM Capabilities
(<http://developer.intel.com/ial/wfm/>)
- Intel Architecture Puts **Java* to Work**
(<http://www.intel.com/businesscomputing/archive/tech3.htm>)

Overview

The proliferation of hardware and software choices, and the explosion of the Internet and Intranet have made the business computing environment increasingly complex and expensive to deploy and manage. Intel is continuing to bring greater performance and capability to the standard business desktop PC, while at the same time increasing its efforts to make it easier to deploy and control.

With the introduction of the Pentium® II processor Intel has combined the power and capabilities of the Pentium® Pro processor with the multimedia and communications capabilities of MMX™ technology. Along with platform technologies like Accelerated Graphics Port (AGP), the standard business desktop now has the visual computing (<http://developer.intel.com/solutions/archive/issue1/focus.htm>) capabilities of PC imaging, 3D graphics, and enhanced video processing that will take business computing to the next level and change the way businesses work with each other and with consumers.

Intel is now working with the industry on technologies that reduce the total cost of ownership and make PC's inherently easier to manage. The Wired for Management (WfM) initiative and Network PC (Net PC) platform are two examples of the tremendous progress made to enable greater control and lower Total Cost of Ownership (TCO).

Wired for Management

Intel's Wired for Management (WfM) initiative is part of a broad-based industry effort to reduce the costs of business computing without compromising compatibility or performance. The initiative includes new hardware and software products to help OEMs and others implement WfM capabilities, alliances with other industry leaders, education and development programs, and Intel-led industry efforts aimed at developing widely accepted manageability standards. Most importantly, the WfM initiative targets real reductions in the most expensive element of business computing: support.

The WfM Baseline Specification establishes a minimum set of management interfaces that enable such capabilities as remote configuration and installation of operating systems and software applications, remote system inventory and monitoring, and after-hours maintenance. OEMs can build further capabilities on this baseline to deliver even more value to their customers.

Network PC (Net PC)

The Network PC, or Net PC, was born out of Intel's WfM initiative to reduce TCO without sacrificing necessary performance. The Net PC introduces a new category of business PC designed from the ground up to be centrally managed, while simultaneously delivering the power and versatility of a traditional business desktop computer. The benefits of the Net PC include remote system configuration over the network, automated distribution of software, simplified remote diagnosis and maintenance, asset management support and a sealed chassis. The built-in manageability features and locked chassis of the Net PC give IT (Information Technology) support staff a known entity, while at the same time locking systems to reduce unauthorized or unplanned changes in the client.

Wired for Management

What's New:

- Desktop Management Interface version 2.0 (**DMI 2.0**) nominated for PC Magazine's **Technical Excellence Award**. Winners to be announced at Comdex.
(<http://developer.intel.com/solutions/tech/xtra/news.htm>)
- Intel **LANDesk® Management Suite 6** Helps Reduce Support Costs; Facilitates First-Call Problem Resolution Efforts for Windows NT* and NetWare* environments
(<http://www.intel.com/pressroom/archive/releases/LD102197.HTM>)
- Intel announces availability of **LANDesk® Client Manager v3.1** to Lower Costs with Wired for Management Support
(<http://www.intel.com/pressroom/archive/releases/LD092997.HTM>)
- Wired for Management **Interoperability event shows momentum of WfM** building blocks
(www.intel.com/pressroom/archive/releases/WM092997.HTM)
- Intel delivers detailed **WfM implementation training** and tools at the Intel Developer Forum
(<http://developer.intel.com/ial/dmi/class/index.htm>)
- Intel updates **Wired for Management ToolKit** with latest WfM Building Blocks:
(<http://developer.intel.com/ial/wfm/>)
 - * Wired for Management Design Guide
 - * Intel DMI 2.0 Service Provider SDK
 - * Managed Object ToolKit
 - * Intel Mobile Component Instrumentation SDK version 1.0
 - * Intel DMI SDK for Servers
- Wired for Management **Baseline Specification Version 1.1a** released
(<http://www.intel.com/managedpc/spec.htm>)
 - * Now Includes Mobile and Server

- Industry Status (see below)
- Next Steps (see below)

Technology Description:

"Manageability" is a **BIG** subject and the focus of several industry-wide initiatives. Intel's Wired for Management (WfM) initiative seeks to raise the level of management capabilities for mobile, desktop, and server platforms. The complementary Zero Administration for Windows* initiative from Microsoft* seeks to create more manageable operating systems and applications. The collective goal of these initiatives is to help plan, deploy, proactively maintain, and centrally control a distributed computing environment, in order to reduce the overall cost of owning and managing computers in the enterprise.

The WfM Baseline describes a consistent set of management capabilities which defines the minimum functions delivered in a target platform. These include requirements for instrumentation, remote wake-up, power management, and service boot capability. Along with the WfM Baseline specification, Intel has produced a set of development tools designed to ease deployment of these capabilities. These include the Intel DMI 2.0 Service Provider SDK, the Managed Objects Toolkit for rapidly developing management applications, the Mobile Component Instrumentation SDK for laptops, and the DMI SDK for Servers. Intel has also made available a WfM Design Guide showing the "how-to" details on implementing the WfM capabilities.

Benefits to Users:

The benefits of WfM Baseline-compliant systems are clear. It enables centralized system management: inventory, fix/repair, configuration and diagnostics, and provides for off-hours maintenance to minimize downtime. Picture a user who's having a problem with a built-in fax program and calls the company support hotline. The user continues using the system while a support technician remotely views the user's configuration and discovers that some files are mismatched to the hardware. The technician makes the needed changes and updates the correct files, all in the background, while the user continues working. Another common scenario is where the IT administrator updates to the latest version of the office productivity application suite automatically during the middle of the night without any user intervention.

Benefits to Manufacturers:

The WfM Baseline is easy for OEMs and developers to adopt and deploy and is based on industry standard management technology. DMI 2.0, for example, is a non-proprietary interface that is easy for vendors to adopt. In addition, DMI is independent of any specific operating system, hardware platform or management protocol. The interface is scalable to accommodate a wide range of products and mappable to existing management and remoting protocols.

Intel's Wired for Management ToolKit makes it easy for OEMs, IHVs, and ISVs to adopt and deliver management capabilities. The tools encourage the addition of value-added features on top of the WfM Baseline within its open-specification structure. The Baseline also provides a consistent target for applications developers including enterprise-wide management solutions.

Industry Status:

Since its initial release in April 1997, the WfM Baseline specification and its companion, the Network PC (Net PC) specification, have received wide industry support from a variety of key industry players. For more information on supporting companies see:

<http://www.intel.com/pressroom/archive/releases/nw31297b.HTM>

For Mobile, visit <http://www.intel.com/pressroom/archive/releases/NW060297.HTM>,

For Server, visit <http://www.intel.com/pressroom/archive/releases/wm063097.htm>

Evidence of the widespread momentum for the WfM initiative was recently demonstrated at the second Intel WfM interoperability workshop on September 26, 1997. Over 20 industry leaders tested the interoperability of manageable platforms and management software showing that Manageable PCs and Net PCs are here now and so are the tools to manage them (see the press release describing the event at <http://www.intel.com/pressroom/archive/releases/WM092997.HTM>).

Intel also provided detailed technical training and tools to further assist OEMs and IHVs in implementing the WfM Baseline specification at the Intel Developer Forum held on September 29, 1997. For more information on the IDF WfM track please go to (<http://developer.intel.com/ial/dmi/class/index.htm>).

Intel and Microsoft are working closely to align their management technologies. This is evident in the work that produced the Network PC (Net PC) specification, which was co-authored by Intel and Microsoft along with other industry partners. The two are continuing to assure that next generation Windows* operating systems are compatible with today's management technologies. This includes joint work on the *PC 98 System Design Guideline* just released in September 1997, and the *Windows Hardware Instrumentation Implementation Guide* (WHIIG) expected to be available in late 1997 or early 1998.

Next Steps:

Specifications have been available for both the WfM Baseline and the Net PC since early 1997. Tools and training have been delivered to the industry. Two interoperability events have been held showing the momentum behind the WfM Baseline and the arrival of product building blocks. If you are currently designing systems or products for desktop PCs, mobile PCs, or servers, now is the time to design and deliver WfM-based products so that businesses can take advantage of this technology to reduce total cost of ownership.

If you missed the Intel Developers Forum (9/29/97–10/1/97), check out all the presentations on-line (<http://developer.intel.com/ial/dmi/class/index.htm>) and be sure to stay tuned to *Platform Solutions* and the IDF web site (<http://www.intel.com/intel/idf/future.htm>) for information on the next IDF in February 1998.

For More Information:

For more information on Mobile manageability, please visit the Mobile PC Manageability site (<http://www.intel.com/mobile/entrprse/managePC/index.htm>).

Helpful development tools may be downloaded from the Wired for Management ToolKit site for immediate deployment (<http://developer.intel.com/ial/wfm/>).

For more information on the Network PC (NetPC) visit Intel's Net PC web site at (<http://www.intel.com/businesscomputing/netpc/>).

For information on Intel's building blocks and manageability products and solutions visit (<http://www.intel.com/managedpc/product.htm>).

For more information on DMI and the DMTF visit the industry DMTF web site at (<http://www.dmtf.org>).

Intel's Managed PC web site contains information on WfM targeted at IT professionals (<http://www.intel.com/managedpc/index.htm>).

For information on Microsoft's Zero Administration for Windows (ZAW) initiative visit their web site at (<http://www.microsoft.com/windows/zaw/>).

DMI 2.0 Nominated for PC Magazine's Technical Excellence Award

Congratulations to the Desktop Management Task Force (<http://www.dmtf.org>)! Its Desktop Management Interface version 2.0 (DMI 2.0) has been nominated for *PC Magazine's* Technical Excellence Award in the standards category by the publication's senior editing staff.

DMI 2.0 is a critical piece of Intel's Wired for Management Initiative (<http://developer.intel.com/solutions/tech/wfm.htm>), providing a platform-independent enabling technology that allows a standard framework of intelligence and manageability to be built into desktop, mobile and server products, both networked and stand-alone. Intel is a founding member of the DMTF, and has been a strong supporter of both the DMTF and an active participant in defining DMI 2.0, as well as a leader in adding support for DMI 2.0 to its products.

PC Magazine will host an awards ceremony and product showcase at Fall Comdex on Monday, November 17, 1997 where the winner of the Technical Excellence Award will be announced.

Network PC (Net PC)

What's New:

- Intel announces availability of **LANDesk® Client Manager v3.1** to Lower Costs with Wired for Management Support
(<http://www.intel.com/pressroom/archive/releases/LD092997.HTM>)
- Wired for Management Specification 1.1a Available
(<http://www.intel.com/managedpc/spec.htm>)
- Intel Developer's Forum—**Wired for Management Track** held on 9/29/97
(<http://developer.intel.com/ial/dmi/class/index.htm>)
- Second WfM Baseline and **Net PC Interoperability Test** Event Held 9/26/97
(<http://www.intel.com/pressroom/archive/releases/WM092997.HTM>)
- **Net PC Case Studies** show advantages of Net PCs
(<http://www.intel.com/businesscomputing/netpc/>)
- Industry Status (see below)
- Next Steps (see below)

Technology Description:

The Network PC, or Net PC, is a new category of business PC intended to reduce ownership costs through its advanced management capabilities while delivering the power and versatility of traditional business PCs. Advanced system administration features, including remote configuration and repair and the ability to "wake up" systems for off-hours maintenance, give IT organizations greater centralized management capabilities while retaining existing LAN infrastructures. Hard disk drives give users the choice of running their Windows*-based business software and storing data locally or on servers.

The Network PC System Design Guidelines specify a number of advanced manageability features that enable easy, central administration. These include:

- **Remote boot.** The system can boot from a management server to receive downloads or updated operating system software or applications.
- **Remote wake-up (Wake-On-LAN* technology).** The system can be turned on remotely for after-hours maintenance.
- **DMI 2.0 support.** System elements using the Desktop Management Interface can be recognized and managed by industry-standard management software.
- **Instrumentation.** System elements such as the baseboard, processor, disks, mouse, keyboard, BIOS and video card can identify themselves and provide management information to standards-based management software.
- **SMART hard drive.** The disk can indicate when it may be about to fail, giving the user time to avoid data loss.
- **Hardware monitor.** The system tracks various indicators of hardware health, such as temperature or chassis open.

Net PCs are "managed" business PCs that cover the full range of price/performance, including high-power systems based on Intel's Pentium® II processor. Products based on the guidelines are emerging at a wide range of performance levels and price points. The Net PC System Design Guidelines was developed by Intel, Microsoft*, Compaq*, Dell* and Hewlett-Packard*.

Benefits to Users:

With its advanced management technologies, controlled configurations and sealed case, the Net PC gives IT managers increased control over the distributed computing environment. In addition, The Net PC offers a platform that is cost-effective to deploy, manage and support, without sacrificing the desktop computing power, local storage and application flexibility that make the PC a versatile and powerful tool for users. By combining PC versatility and performance with centralized, network-based manageability, the Net PC truly delivers a valuable new tool for business. The Net PC is most appropriate for companies centralizing PC management and for those data- and task-focused users who need no hardware expandability. For example, it is ideal for information delivery, customer support, manufacturing, finance and training.

Benefits to Manufacturers:

The overall Net PC solution is spurring the adoption of manageability by driving initiatives to increase base client management capability. By designing to the Net PC System Design Guidelines OEMs will be able to integrate network-based remote manageability features into their business desktop PC product lines.

Industry Status:

Intel's announcement of the Wired for Management (WfM) initiative in September 1996 generated considerable enthusiasm for managed PCs from OEMs, independent workgroup and enterprise management software vendors, and end-users. Intel has followed up the initial announcement with a series of events and tools delivered to the industry in 1997. The following events have taken place this year to further enable manageability in PCs and servers:

- *Publication of the Wired for Management Baseline 1.0*
- *Publication of the Net PC System Design Guidelines*
- *Net PC Interoperability events (June and September)*
- *Net PC Introduction and Product Announcements*
- *Publication of the Wired for Management Baseline 1.1a*
- *Publication of the Wired for Management tool kit*
- *Introduction of LANDesk® Client Manager v3.1*
- *Introduction of LANDesk® Management Suite 6*

The second WfM Baseline and Net PC Interoperability test was held on September 26, 1997. Over 20 OEMs, IHVs, and Manageability vendors attended and tested their products showing that Manageable PCs and Net PCs are here now and so are the tools to manage them (see the [press release](http://www.intel.com/pressroom/archive/releases/WM092997.HTM) describing the event at <http://www.intel.com/pressroom/archive/releases/WM092997.HTM>).

Intel also provided detailed technical training and tools to further assist OEMs and IHVs in implementing the WfM Baseline specification at the Intel Developer Forum held on September 29, 1997. For more information on the [IDF WfM track](http://developer.intel.com/ial/dmi/class/index.htm) please go to (<http://developer.intel.com/ial/dmi/class/index.htm>).

Net PC systems began shipping from OEMs in the third quarter of 1997.

Next Steps:

Specifications have been available on both the WfM Baseline and the Net PC since early 1997. Tools and training have been delivered to the industry. Two interoperability events have been held showing the momentum behind WfM baseline and Net PC and the arrival of product building blocks. Now is the time for OEMs, IHVs, and Manageability software vendors to design and deliver WfM-based and Net PC products so that businesses can take advantage of this technology to reduce total cost of ownership.

Stay tuned to Platform Solutions for the next WfM and Net PC Interoperability Event expected in the first half of 1998, and news on the next Intel Developer Forum in February 1998.

For More Information:

For more details on Net PCs, visit [Intel's Net PC web site](http://www.intel.com/businesscomputing/netpc/) at (<http://www.intel.com/businesscomputing/netpc/>).

For more details on the Wired for Management initiative from an IT perspective, visit [Intel's Managed PC web site](http://www.intel.com/managedpc/index.htm) at (<http://www.intel.com/managedpc/index.htm>).

For all the instructions, tools, and specifications for delivering Wired for Management systems and products, visit the [WfM Toolkit site](http://developer.intel.com/ial/wfm/) at (<http://developer.intel.com/ial/wfm/>).

Platforms: (continued)

Home Platforms

What's New

- Fall Comdex shows how **Intel is enabling new Home platforms** for Entertainment, Creativity, and Education. Read this month's Top Story by John Davies, Intel Vice President and Director of Consumer Desktop Products
(<http://developer.intel.com/solutions/issue/stories/top3.htm>)
- Intel Releases **971 PC Camera Kit** for Production of Affordable, Easy-to-Use, Portable PC Cameras
(<http://www.intel.com/pressroom/archive/releases/pi110397.htm>)
- Intel Guidelines Bring **More Compatible and Interactive DVD Titles** to PCs
(<http://www.intel.com/pressroom/archive/releases/IV102997.HTM>)
- Intel Introduces **Create & Share™ Camera Pack**
(<http://www.intel.com/pressroom/archive/releases/PS091597.HTM>)
- Intel's Pentium® II Processor Hits the Web
Comprehensive **Consumer Marketing & Advertising Campaign** Kicks Off
(<http://www.intel.com/pressroom/archive/releases/CN091697.HTM>)
- **Pentium® II processor-based systems available** at mainstream price points from major PC manufacturers
(<http://www.intel.com/PentiumII/systems/index.htm>)

Overview

The Home PC is already the center of creativity, entertainment and education in many households today. With the advent of the Pentium® II processor and Dual Independent Bus (DIB) architecture, and new platform technologies such as AGP, USB and DVD, the home PC is bringing new compelling capabilities to both experienced consumers and first-time buyers. The introduction of Intel's Pentium II processor, when combined with the Internet and the emergence of PC photo processing, video editing, 3D graphics, digital audio, and video phones, is changing the way we work, learn, play, and communicate using our PCs at home.

Advancing the processor and platform technologies is critical to driving new levels of performance and capability that enable new and exciting PC platform uses. These new platform technologies go hand in hand with the enhanced capabilities of the Pentium II processor. Now available at speeds of 233, 266, and 300 MHz, the Pentium II processor combines the advanced features of Intel's sixth-generation processor, like Dynamic Execution and Dual Independent Bus architecture, with the enhanced multimedia and communications processing power of MMX™ technology.

The Pentium II processor delivers the best performance on all three vectors of computing: integer execution, delivering higher performance on all consumer software; floating point, delivering improved 3D graphics for more realistic images and games; and multimedia, using MMX technology to deliver improved imaging, video, and communications. When combined with Intel's newest AGP chipset, arcade quality graphics and DVD are possible now on the mainstream consumer PC.

Educated consumers are demanding the best PC performance to be ready for new and exciting applications. Multipurpose PCs are evolving into special categories focused to meet the needs of these educated consumers. Two major trends have emerged in consumer PC usage today: creativity and entertainment. Intel is enabling platform improvements that support these trends through the Creativity PC and the Entertaining PC initiatives.

Creativity PC

The Creativity PC (<http://developer.intel.com/solutions/tech/creapc.htm>) enables enhanced multimedia and imaging capabilities to make possible:

- Personal photography and albums
- Audio mixing and remixing
- Video editing
- Communicating your creations with family and friends

The emergence of low-cost digital cameras with USB connectivity is making the Creativity PC a hot new category this year. These cameras utilize the PC processing power of the Pentium II processor with MMX technology to allow you to capture, store, edit, and send digital photos over the Internet.

Entertaining PC

The Entertaining PC takes the traditional consumer desktop multimedia PC to a new level of capability using the Pentium® II processor, DIB architecture, AGP, DVD, and AC '97 Audio. Consumers who enjoy games and edutainment will now be able to experience a dramatic new level of 3D realism. With the inclusion of DVD drives, the Entertaining PC allows the user to play back high-quality DVD movies and take advantage of rich interactive DVD applications. With DVD, ISVs are taking advantage of the increased storage capacity to provide higher quality video, audio and graphics in games, edutainment and reference applications. Please see the following pages in Platform Solutions to learn how Intel is enabling these critical Entertaining PC platform technologies.

- **AGP** (<http://developer.intel.com/solutions/tech/agp.htm>)
- **DVD** (<http://developer.intel.com/solutions/tech/dvd.htm>)
- **Audio** (<http://developer.intel.com/solutions/tech/audio.htm>)

Creativity PC**What's New:**

- Understand Intel's PC Imaging vision directly from Peter Green, General Manager of Intel's Digital Peripherals Division, in this month's Top Stories
(<http://developer.intel.com/solutions/issue/stories/top4.htm>)
- Intel Announces New 971 PC Camera Kit for Production of Affordable, Easy-to-Use, Portable PC Cameras
(<http://www.intel.com/pressroom/archive/releases/pi110397.htm>)
- Check out Intel's New PC Imaging Web Site for Developers
(<http://www.intel.com/design/imaging/>)
- Details on Intel's new Create & Share™ Camera Pack
(<http://www.intel.com/createshare/looktech.htm>)
- Lots of information available on the benefits of the Pentium® II processor for the Home
(<http://www.intel.com/home/PentiumII/index.htm>)
- Portable PC Camera '98 Design Guideline Available for Download
(<http://www.intel.com/design/imaging/guide.htm>)
- Industry Status (see below)

- Next Steps (see below)

Technology Description:

The Pentium II processor, when combined with cool creativity software, enables new capabilities in:

- Video editing and playback (splice 'n dice your own videos)
- Audio remixing (Mix your own sound tracks)
- PC Imaging (capture, edit images, store and share with friends)

Imaging software has exploded with many popular titles designed for Intel MMX™ technology which brings significant performance to the category. Today digital cameras, scanners and photo printers are widely available at affordable prices. Audio creativity has hit mainstream. Previously audio was available only to musicians with special input devices and complicated software. Now with consumer software and the power of the Pentium II processor, anybody can be a musician.

Some of the features expected on the 1H'98 Pentium II processor-based Creativity PC SKUs are: video capture; audio and video in/out connectors; USB connectors; CD-recordable/Zip drive; PCI audio (AC'97); POTs video conferencing camera; software for video, image, and music editing.

PC OEMs also have the opportunity to include imaging peripherals like scanners, photo printers, and digital cameras.

Other technologies developing on the consumer platform to support Creativity PCs either now or in the future are:

- **USB**—(<http://developer.intel.com/solutions/tech/usb.htm>)
- **1394**—(<http://developer.intel.com/solutions/tech/1394.htm>)
- **AGP**—(<http://developer.intel.com/solutions/tech/agp.htm>)
- **DVD**—(<http://developer.intel.com/solutions/tech/dvd.htm>)
- **Digital Audio**—(<http://developer.intel.com/solutions/tech/audio.htm>)

Benefits to Users:

The Pentium II processor-based PC is the center of Creativity. It is unparalleled in handling pictures and video on your PC. New uses for consumers include photo management and albums, photo editing, personal publishing, Internet post cards, video editing, music creation, and 3D for fun. Here are some examples of what consumers can do with their creativity PCs:

- Entertainment: digital "shoe-box," personalized cards, family tree, games, hobbies, home movies
- Utility: book reports, asset inventory, home improvements
- Sharing: E-mail, WWW, prints
- Video/image management: archival, retrieval
- Image manipulation: enhancement, orientation, size
- Video editing: add text, special effects, transitions
- Small business: presentations, sales collateral, product catalogs, brochures, newsletters, publishing

The PC just got more exciting with the Creativity PC!

Benefits to Manufacturers:

New opportunities to sell new PCs and peripherals. Consumers are looking to buy digital cameras and PCs that have creativity capabilities.

Industry Status:

Creativity PCs are available now! PC OEMs are quickly recognizing the purchasing power of this prospective audience. New creativity PCs are available now from major manufacturers. More are expected in 1998 as the Pentium II processor moves into the volume mainstream.

Next Steps:

Offer Pentium II processor-based Creativity PC SKUs in 1H'98 with video editing software, video capture, CD-recordable storage, audio and video in/out. Look for opportunities to sell peripherals and software as part of your Creativity PC SKU. Other opportunities include providing incentives for end-user purchase of peripherals and software.

Take advantage of Intel's Pentium II processor advertising campaign and promote the Creativity PC in the channel and in your advertising to increase awareness for the category.

For More Information:

Intel's [new PC Imaging site for developers](http://www.intel.com/design/imaging/) with lots of information on PC Cameras (<http://www.intel.com/design/imaging/>)

Lots of information available on the usage of Intel's [Pentium II processor for the Home](http://www.intel.com/home/PentiumII/index.htm) (<http://www.intel.com/home/PentiumII/index.htm>).

Visit Intel's [Create & Share™ Camera Pack web site](http://www.intel.com/createshare/crshare.htm) and learn how the camera and the PC can be used for fun (<http://www.intel.com/createshare/crshare.htm>).

Intel's [PC Imaging initiative site](http://www.intel.com/imaging/index.htm) with lots of new information including links to Intel's Smart Video Recorder III and Kodak's FlashPix* file format site (<http://www.intel.com/imaging/index.htm>).

Information available on other technologies developing on the consumer platform to support Creativity PCs either now or in the future:

- **USB**—(<http://developer.intel.com/solutions/tech/usb.htm>)
- **1394**—(<http://developer.intel.com/solutions/tech/1394.htm>)
- **AGP**—(<http://developer.intel.com/solutions/tech/agp.htm>)
- **DVD**—(<http://developer.intel.com/solutions/tech/dvd.htm>)
- **Digital Audio**—(<http://developer.intel.com/solutions/tech/audio.htm>)

Platforms: (continued)

Mobile Platforms

What's New

- Intel **Extends Family Of Mobile Processors** Bringing MMX™ Technology to Mini-Notebooks (<http://www.intel.com/pressroom/archive/releases/MP102097.HTM>)
- New **Mobile Pentium® Processors with MMX Technology** Provide 40% Increase in Performance and 50% Lower Power Consumption (<http://developer.intel.com/design/mobile/>)
- Intel Hosts **Fourth Mobile Data Initiative Interoperability Workshop** to Explore GSM/ISDN Interoperability (<http://www.intel.com/pressroom/archive/releases/WE102497.HTM>)
- Intel Hosts **Mobile Power Symposium** to Deliver High-Performance, Power-Efficient Mobile PCs (<http://www.intel.com/pressroom/archive/releases/MP091797.HTM>)
- **Mobile Power Initiative & Mobile Power Guidelines '99** Introduced by Intel (<http://developer.intel.com/design/mobile/intelpower/>)

Overview

Providing Mobile PC users with the flexible environment they require has always been a challenge. IT management challenges include affordability, maintenance, administration, productivity and security. Notebook users need desktop equivalent capabilities in a mobile form factor that's portable. They won't sacrifice performance for mobility, and they need the lowest possible power consumption providing the longest battery life on the road. Users also require seamless communications—over the LAN, the phone line, and through wireless technologies.

Intel is meeting those challenges with its mobile computing vision: anytime, anywhere performance and productivity. Intel is committed to enabling and delivering cost effective, high performance computing solutions that focus on power efficiency, remote manageability, and mobile communications.

Mobile Power Initiative

Intel recently doubled the performance per watt with the introduction of the new mobile Pentium® processor with MMX™ technology at 233MHz. However, as the industry prepares to design systems for 1999—and users continue to demand more features—balancing power, battery life and size is ever more challenging. By designing with the Mobile Power Initiative in mind, it is possible to deliver high-end mobile features without sacrificing reliability and extended battery life.

The **Mobile Power Initiative** (<http://developer.intel.com/solutions/tech/mpi.htm>) is an industry-wide program for mobile PC system manufacturers, component suppliers and software vendors. This comprehensive initiative addresses the industry's power consumption challenges in three major areas: System Hardware, System Software, and Application Software. Intel has made available new high-performance, power efficient microprocessors and other building blocks, new Mobile Power Guidelines (revision 0.90), and a broad array of tools and specifications to support power efficient hardware and software development. The Mobile Power Initiative is supported by a broad array of leading PC system manufacturers, component suppliers and software vendors.

Mobile Manageability

Through the **Wired for Management Initiative** (<http://developer.intel.com/solutions/tech/wfm.htm>), Intel is leading the industry to define and deliver the managed mobile PC. Mobile manageability was added to the WfM Baseline specification in June '97, and Intel is providing mobile instrumentation tools and software to enable mobile OEMs to offer managed mobile PCs.

Mobile computers are only occasionally connected; they have a smaller 'pipe' connection, and they tend to use a variety of dynamically swappable devices. But administrators still need all of the desktop management features, such as software distribution, asset tracking, and remote diagnosis/repair, plus additional features to address unique mobile challenges. Intel's WfM initiative is now addressing these for mobile computers.

By offering mobile manageability solutions—such as tools to enable platform instrumentation, as well as the LANDesk® Client Manager application—we are able to lower the total cost of ownership by providing mobile clients and administrators with reduced downtime and higher productivity than ever before.

Several leading manufacturers are already shipping early versions of mobile managed PCs. These systems provide desktop equivalence while connected to the LAN. Intel will help OEMs to enable more fully instrumented notebook platforms and remote dial-up by the first half of 1998.

Mobile Data Initiative

Formed and led by Intel, the **Mobile Data Initiative** (<http://developer.intel.com/solutions/tech/mdi.htm>) is a cross-industry effort to provide mobile PC users with an easy and affordable wireless connection to data networks, using cellular telephones linked to mobile PCs.

The Mobile Data Initiative unites three exciting technologies. The combination of powerful mobile PCs, digital wireless telephony, and the Internet gives business users new resources that they can leverage while out of the office. With these new products and services, business professionals have fast, reliable and cost-effective access to information wherever their business takes them.

Mobile Power Initiative

What's New:

- **Mobile Power Initiative & Mobile Power Guidelines '99** Announced by Intel (<http://developer.intel.com/design/mobile/intelpower/>)
- Intel Hosts **Mobile Power Symposium** to lead the industry to deliver High-Performance, Power-Efficient Mobile PCs (<http://www.intel.com/pressroom/archive/releases/MP091797.HTM>)
- Mobile Power Guidelines '99 **version 1.0 to be finalized** in November, 1997
- Industry Status (see below)

Technology Description:

Mobile computers are becoming increasingly more sophisticated, incorporating many of the features of high performance desktop systems, such as high performance processors, second level cache, better graphics, DVD drives, and new I/O busses like Universal Serial Bus (USB). Projecting this trend forward over the next few years, mobile PCs will incorporate larger LCD screens, accelerated 3D graphics, more system memory, and 1394 based I/O devices. These are compelling new capabilities, but the challenge is meeting the system power requirements to implement them in a variety of form factors, while providing reasonable battery life.

Mobile platform power has increased 90% between 1994 and 1997 and is expected to increase another 85% between 1997 and 1999. Battery capacity has not kept pace, only increasing around 10-15% a year. If this power consumption trend continues, it will soon outpace mobile thermal capabilities limiting future system features, performance, and battery life. While mobile power consumption has been increasing rapidly, cooling techniques to remove the heat generated within the mobile PC have been evolving more slowly. Current notebook systems measuring 8-½ x 11 inches with base unit thickness

(excluding screen) between 0.75 inches and 1.5 inches can dissipate about 23 to 25 watts (excluding screen). Smaller mobile PC form factors pose even tougher thermal and battery life challenges. Even though significant advances in power management are providing benefits today, like Advanced Power Management (APM) and the Smart Battery System (SBS), the power challenges outlined above still remain.

To proactively address these challenges, Intel has developed the Mobile Power Initiative, an industry-wide program for power management that is supported by a broad array of leading PC system manufacturers, component suppliers and software vendors including IBM*, Toshiba*, Compaq*, Dell*, NEC* and Microsoft*, among others. This comprehensive initiative addresses the mobile PC industry's power consumption challenges in three major areas: System Hardware, System Software, and Application Software.

System Hardware

System hardware focuses on key mobile platform components including processors, chipsets, displays, etc. Intel has worked with the industry to define specific power and, when needed, performance guidelines for each platform component. Currently Intel is working with the industry to finalize the Mobile Power Guidelines for systems to be released in 1999. In order to assist the industry in meeting these agreed upon targets, the guidelines contain suggestions on design and integration techniques, process improvements, and voltage reductions. Since 1994, Intel has been able to utilize some of these suggestions to increase the performance of its mobile processors by 3X while decreasing the power by 40%. You can download a copy of the Mobile Power Guidelines for the '99 platform from [the Intel Mobile Power Initiative web site](http://developer.intel.com/design/mobile/intelpower/) (<http://developer.intel.com/design/mobile/intelpower/>).

System Software

In order to better manage power on the PC platform, Intel, together with Microsoft* and Toshiba*, developed the Advanced Configuration and Power Interface (ACPI) standard. This hardware system specification allows for the transfer of power management from the BIOS to the operating system, enabling, for the first time, demand-based peripheral and power management. Today, most hardware resources are turned on and off based on timers that look for periods of device inactivity. Under ACPI, applications will be able to tell the operating system which devices it needs to use and when, providing the most efficient use of resources. For example, while you are giving a presentation the application software could tell the operating system not to blank the screen.

As part of the Mobile Power Initiative, Intel is providing development tools and resources to help ensure that systems supporting ACPI will be available beginning in the first half of 1998. One of these tools, the Intel Power Analyst measures power consumption by component, which allows operating system vendors and PC system manufacturers to optimize their system power management. ACPI support is available in Intel's processors and chip sets and, according to Microsoft, in Windows* 98 and future versions of Windows NT*.

For more information on Operating System Power Management, the [Intel Power Analyst and other power management tools](http://www.intel.com/mobile/tecforum/os.htm), please visit (<http://www.intel.com/mobile/tecforum/os.htm>).

Application Software

Application software consumes power by using system resources. Some programs use resources inefficiently and don't allow idle devices to enter low-power states. Addressing this issue by making power-efficient application software can provide significant improvements in battery life.

As part of the Mobile Power Initiative, Intel is providing power monitoring and analysis tools that can help software developers identify and correct power wasting code. Intel offers the Intel Power Monitor, a tool already being utilized by the leading office suite applications, to help developers optimize code for improved power efficiency. Software guidelines are also available to help developers create applications that use less power.

For more information on the [Intel Power Monitor and application guidelines](http://www.intel.com/mobile/tecforum/sw.htm), please visit (<http://www.intel.com/mobile/tecforum/sw.htm>).

Benefits to Users:

By implementing the comprehensive Mobile Power Initiative, the industry should be able to meet the growing user demand for more compelling features and performance in the '99 mobile platform and beyond. All these new features should be implemented on a platform that's within mobile thermal limits. This will benefit everyone in the mobile computing community. Mobile computer users will get more robust systems with new features like high performance processors, second level cache, 3D graphics, DVD drives, and new I/O busses like USB and 1394. In addition, the changes advocated in application and system software will help users maximize the use of their battery resources.

Benefits to Manufacturers:

The desire for new compelling features continues to drive the growth in the mobile industry. The Mobile Power Initiative provides a comprehensive plan to continue adding compelling features within mobile thermal limits. System and component manufacturers will be able to deliver more innovative, compelling, and reliable systems by utilizing lower power components and lighter-weight thermal solutions.

Industry Status:

During the September '97 Mobile Power Symposium, Intel outlined an industry vision for future mobile PCs that are high-performance, feature-rich and power-efficient. As part of its continuing efforts to manage power consumption on mobile PCs, Intel announced the Mobile Power Initiative, a comprehensive, industry-wide program supported by mobile PC system manufacturers, component suppliers and software vendors. At the event, many industry leading companies pledged their support for the initiative, and will work towards delivering components and systems that meet the Mobile Power Guidelines in the future. In addition, Intel is leading a number of enabling programs to further assist the industry in developing these new components and systems.

The Intel Mobile Power Guidelines '99, announced at the Mobile Power Symposium, has been through industry review and will be finalized in November 1997.

For more Information:

For more information on the Mobile Power Symposium
(<http://developer.intel.com/design/mobile/intelpower/symposium.htm>)

For more details on the Intel Mobile Power Initiative
(<http://developer.intel.com/design/mobile/intelpower/>)

To Download the Mobile Power Guidelines
(<http://developer.intel.com/design/mobile/intelpower/#two>)

For more information on Mobile System Software and OS power management
(<http://www.intel.com/mobile/tecforum/os.htm>)

To get more details on Software and the Mobile Software Guidelines
(<http://www.intel.com/mobile/tecforum/sw.htm>)

Mobile Data Initiative

What's New:

- Intel Hosts **Fourth MDI Interoperability Workshop** to Explore GSM/ISDN Interoperability (<http://www.intel.com/pressroom/archive/releases/WE102497.HTM>)
- **North American MDI** Introduced - press release, August 1997 (<http://www.intel.com/pressroom/archive/releases/mp080497.HTM>)
- See who the **North American MDI members** are (<http://www.pcsdata.com/participants.htm>)
- **History of the MDI** (<http://www.intel.com/mobile/entrprse/mdi.htm>)
- Industry Status (see below)
- Next Steps (see below)

Technology Description:

The Mobile Data Initiative (MDI) is an affiliation of leading technology companies including mobile phone network operators, telecommunications vendors, and mobile PC hardware and software manufacturers. Intel established and leads the MDI with a goal of enabling mobile users to stay connected via a simple, cost-effective wireless connection to data networks.

MDI endorses GSM (Global System for Mobile Communications) technology as the best way to exchange data wirelessly today. GSM is secure, reliable and has the most extensive global coverage of all digital networks. In fact, GSM is used by over 44 million people throughout the world today. PCS1900, an adaptation of the GSM standard for North America, is compatible with GSM networks in Europe and elsewhere around the world. MDI will also endorse other digital wireless telephony technologies as soon as they become business-ready.

Benefits to Users:

Wireless mobile computing completes the business traveler's remote office by making it possible for traveling professionals to stay connected anytime--anywhere their business takes them.

By simply connecting a digital wireless telephone to a notebook computer, business travelers can remotely gain secure access to all of the resources they have while in the office: e-mail, fax, corporate LAN and Internet/intranet. So there's no need to wait for FedEx*, a hotel fax, or even to locate a phone jack; users have immediate access to data and networks wherever they are, and critical information can be relayed on the spot. The downtime that travelers often experience, whether waiting for a flight, in a cab or on a train can now be put to productive use through wireless mobile computing.

Best of all, it's easy. The technology leverages notebook PCs and mobile phones, both powerful tools that business travelers already use. So there's no need to learn to use a new device or to carry extra equipment along--the same phone business travelers use to talk can also be used to transmit data.

Benefits to Manufacturers:

Intel continues to spearhead the Mobile Data Initiative by bringing industry leaders together with a commitment to delivering seamless, integrated solutions. Intel held the first North American "PlugFest" in July 1997 to bring together leading manufacturers of notebook PCs, GSM phones, PCMCIA adapter cards, network data services, and software. Intel will continue to provide interoperability workshops for this community, and actively promotes the development of new products and services.

Intel and the MDI are also working to raise the awareness of this technology and its benefits. These efforts are designed to help spur customer demand for all the components of wireless mobile computing

solutions: notebook PCs, wireless phones, PCMCIA adapter cards, access to digital wireless networks and communications software.

Industry Status:

The North American Mobile Data Initiative was launched on August 4, 1997, following a successful European launch earlier in October 1996. The North American MDI currently has 12 core member companies, including the members of the GSM Alliance in the U.S. GSM networks have launched commercial service across the U.S.; voice service is available in nearly half the nation's top 50 metropolitan areas, and data service is coming to most markets soon. GSM networks now serve millions of subscribers worldwide, with a rapidly growing subscriber base in the U.S. Planned coverage will reach virtually the entire U.S. population.

MDI members will continue to introduce products and services that enhance wireless mobile computing throughout 1997 and 1998. Other technologies are currently being evaluated for inclusion in the Mobile Data Initiative.

On October 24 in Lisbon, Intel hosted the fourth Mobile Data Initiative interoperability workshop, focusing on GSM/ISDN interoperability. The workshop tested key elements of the communications link between the notebook PC, the GSM digital network and the ISDN network.

Next Steps:

If you would like more information about the Mobile Data Initiative, or would like to participate in the next "PlugFest" interoperability workshop, please complete a form at one of the following web sites:

In North America, http://www.pcsdata.com/feedback_cgi.html

In Europe, http://gsmdata.com/feedback_cgi.html

For More Information:

To get more information about the MDI effort, visit the **North American MDI web site** (<http://www.pcsdata.com/>).

Or, the European MDI web site is at (<http://gsmdata.com>)

Intel's Mobile Computing/Wireless Data Communications site also provides a broader view on wireless mobile computing issues and implementation in the U.S. as well as Europe (<http://www.intel.com/mobile/entrprse/wireles.htm>).

Platforms: (continued)

Server Platforms

What's New

- Intel Announces Availability of New **Hardware Design Guide for Windows NT* Server**
(<http://www.intel.com/pressroom/archive/releases/SP110497.HTM>)
* Download Guide at: (<http://www.intel.com/procs/servers/resource/index.htm>)
- Intel and Industry Leaders Unveil **Intel-Based Servers with I₂O® Technology**
(<http://www.intel.com/pressroom/archive/releases/io100797.HTM>)
- **New 64-Bit Processor** Will Extend the Intel Architecture for Servers—
Joint Intel/HP 64-Bit Instruction Set Disclosed at the Microprocessor Forum
(<http://www.intel.com/pressroom/kits/events/mpf1097.htm>)
- Intel Helps **Reduce Server Downtime** with Enhanced Management Capabilities through LANDesk®
Server Manager V3.0 Product
(<http://www.intel.com/pressroom/archive/releases/ld100897.HTM>)
- Check Out Intel's **New Server Product Building Blocks**
(<http://developer.intel.com/design/servers/>)
- Intel Shows Paths to **Competitive Business Computing** at Network+Interop
(<http://www.intel.com/pressroom/archive/releases/nw100797.HTM>)
- **Intel to Acquire Corollary Inc.**—a privately held supplier of IA based multiprocessing technology
(<http://www.intel.com/pressroom/archive/releases/SP093097.HTM>)

Overview:

Intel architecture has been the engine at the heart of industry-standard, high-volume servers since the first i386™ processor-based PC was turned on its side and loaded with Netware®, well over a decade ago. Advances in server platform performance and capabilities since then have primarily been prompted by two fundamental forces: 1) Moore's Law-driven advances in microprocessor performance (please see the feature article in Issue #2 of *Platform Solutions* by Gordon Moore based on his keynote address at the Intel Developer Forum) (<http://developer.intel.com/solutions/issue/feature.htm>), and 2) competition and innovation enabled by widely adopted industry standards.)

No one today would think of installing a server that didn't contain at least one PCI bus. Many server designs include two, three or more PCI buses for maximum bandwidth and throughput. Increasingly, servers are designed with "smart" peripheral controllers that off-load the main processor from low-level I/O chores. Many different approaches to high availability and scalability using various clustering techniques are now starting to be widely used. Finally, storage subsystems are rapidly evolving from the relatively limited realm of SCSI to the practically unlimited environment of Fiber Channel and intelligent, network-attached storage devices.

The result of all of this technological innovation is more performance at a lower price, with freedom from proprietary lock-in as an added bonus. Intel is focused on four main technology areas to further advance the Standard High-Volume (SHV) server platform:

1) scalability, 2) manageability, 3) I/O and 4) flexibility.

Scalability

Ask four IT managers what they mean by “scalability,” and you will get at least four different answers. To Intel, “scalability” means “never being forced to turn away requests for service due to lack of computer system resources.” Intel and the SHV server industry are addressing the scalability challenge in two ways: 1) ongoing, rapid improvements in the performance and throughput of the core electronics complex, including Intel processors and chip sets, and 2) industry-standard, extremely high-performance methods of combining multiple SHV servers together into robust scalability clusters.

The Virtual Interface (VI) Architecture is the critical standard that Intel, Compaq*, and Microsoft*, along with over 100 contributor companies, are promoting for high-performance scalability clusters. Robust, high-performance SHV server building blocks, combined with industry-standard, high-performance clustering techniques (and the right kind of cluster-enabled database software), allows the construction of very high-performance and high-capacity server systems that are relatively low-cost when compared to proprietary alternatives.

Regardless of the scale of the workload, such systems will almost never have to turn down a request for service. They will exhibit virtually limitless scalability.

Manageability

As part of its Wired for Management (WfM) Initiative (<http://developer.intel.com/solutions/tech/wfm.htm>), Intel has recently added a server management section to the WfM Baseline Specification. Currently at a 1.1a revision level, Intel is working with leaders in the server management industry to create a 2.0 version of the WfM specification that addresses more of the manageability requirements that are unique to the SHV server platform.

The goal of WfM for servers is to define a broadly accepted and implemented “baseline” level of instrumentation and management features that are available to all management tools written to the baseline. Intel does not expect to include all of the possible aspects of server management in the baseline. Manageability is a critical competitive differentiator for SHV server makers. Intel expects that to continue. The WfM baseline specification for servers merely creates a “starting point” for server management that should be the minimum expectation for any server to be considered “manageable.”

I/O

File and network input/output is the primary thing that servers do, whether the higher-level function they’re performing is database, file/print, Internet, e-mail, etc. Server I/O capacity and throughput are crucial to the overall performance and headroom of the server application. Intel has been working for over a decade to improve server I/O subsystem capacity and throughput. From ISA to EISA to PCI, and on to multiple PCI buses in a single server, Intel provided much of the core technology and enabling silicon products that permitted these improvements.

Intel continues to work to advance the capabilities of the SHV server I/O subsystem. In 1998, SHV servers will be able to accommodate next-generation 64-bit PCI cards. Operating at 33MHz, the 64-bit PCI bus in next year’s server systems will be able to transfer a peak of 266Mbytes per second, twice today’s 133Mbytes. In addition, next year’s servers will provide more PCI expansion slots and more PCI buses than today’s SHV servers can provide. The result is more I/O capacity and greater peak I/O performance, which will be required in order to keep pace with the much higher performance of the core electronics complex.

But raw performance is only part of the story. The overall system I/O architecture is also a critical element. Historically, SHV servers have used monolithic I/O drivers and controllers. These solutions provide good performance for a single card or I/O function, but they deliver that performance at a significant cost in terms of processor and interrupt load. The net result is often less aggregate performance than the system is theoretically capable of providing. So-called “intelligent” network and

disk interface cards have also been long available for SHV servers. These cards incorporate a microprocessor and use specialized drivers to off-load a portion of the I/O or networking functions from the main processor. What's been missing is an **industry standard** that allows every SHV server I/O subsystem to operate in an intelligent fashion.

The Intelligent I/O (I₂O[®]) Specification (<http://developer.intel.com/solutions/tech/i20.htm>) provides just such an industry standard. It is targeted at resulting in better overall system performance, scalability and headroom, with the added benefit of reducing the amount of validation work required for new cards and drivers.

Flexibility

Today's SHV servers come in all shapes and sizes. Server vendors configure systems to fit specific purposes according to their market focus. Number of expansion slots and chassis designs vary enormously, among other options. There can never be a one-size-fits-all standard for servers. The range of applications and uses is simply too diverse. However, Intel believes that it is both possible and desirable to create industry standards for selected server modules, such that many different types of final systems can be successfully configured from standards-based building blocks.

Using a common set of building blocks, a system vendor or systems integrator could configure a very large-scale compute server, for example, with many multiprocessing compute nodes in a cluster, and relatively little I/O capacity. A large-scale data-warehouse platform could be constructed from many processor and I/O subsystem building blocks. The common denominators between all of these configurations are industry-standard building-block modules and standards-based, high-performance clustering interconnects.

Expect announcements from Intel and the industry in the near future on standard building-block modules and clustering interconnects.

Virtual Interface (VI) Architecture

What's New:

- **SAP and Intel Announce Formation of **SAP Intel Center of Expertise**.**
The center will focus on VI Architecture, IA-64 Optimization, Network/Cluster technologies.
(<http://www.intel.com/pressroom/archive/releases/sp082597.HTM>)
- **Oracle and Intel Announced Development Collaboration** focused on IA-64 and VI architecture
(<http://www.intel.com/pressroom/archive/releases/sp062397.htm>)
- **VI Architecture Initiative** to Define High-Speed Communication Interfaces
(<http://www.intel.com/pressroom/archive/releases/sp041697.htm>)
- Industry Status (see below)
- Next Steps (see below)

Technology Description:

Over the last 15 years, high-speed networking hardware has advanced rapidly, with technologies such as ATM, Fast Ethernet and Fiber Channel offering orders-of-magnitude improvements over previous LAN and WAN technologies. On the software side, however, the overhead associated with communicating between the nodes of a large-scale cluster has remained essentially unchanged—until now.

The Virtual Interface (VI) Architecture is an open industry specification designed to facilitate the movement of distributed enterprise applications onto large-scale, high-volume, Distributed Message Passing (DMP) clusters. The VI Architecture defines mechanisms for low-latency, high-bandwidth message-passing between interconnected nodes and interconnect storage devices (e.g. clusters). Low latency and sustained high bandwidth are achieved by avoiding intermediate copies of data and

bypassing the operating system when sending and receiving messages. Elimination of this overhead not only enables significant communication performance increases, but also results in a significant increase in the number of CPU cycles available for performing other tasks.

Benefits to Users (IT):

The cluster solutions available today depend on the use of non-standard interfaces, software and often hardware, usually running on one hardware configuration only and using one operating system. There is very little investment preservation as hardware and software technologies evolve. The VI Architecture defines a standard interface that allows distributed clustered applications a single hardware/software interface that results in more portable application code as technology advances occur. This portability allows customers to run their most complex enterprise-class applications on affordable, high-volume, open computing clusters whose high availability-modularity and reliance on industry standards help reduce Total Cost of Ownership (TCO).

Benefits to Manufacturers:

The VI Architecture allows manufacturers to gain a framework for designing and building low-latency, high-reliability clusters for the volume space. The economies achieved through volume manufacturing of these systems allow clusters to be assembled at a fraction of the price, while surpassing mainframes and supercomputers in both performance and reliability. This fosters the growth of economical, innovative implementations, which offer more value to end users.

Industry Status:

The VI Architecture is in the definition phase, and is being jointly specified by Compaq Computer Corporation*, Intel Corporation and Microsoft Corporation*. Since the original development efforts began in January 1996, more than 100 other industry leaders have joined to endorse the collective endeavor. A preliminary specification of VI Architecture was distributed to participating vendors in January 1997 and a final specification is expected to be released in early 1998.

Next Steps:

Companies wishing to participate in the VI Architecture specification process should send an e-mail request for details to wire@co.intel.com. Check out the details on the VI architecture at the web site below.

For More Information:

Visit [Intel's Virtual Interface \(VI\) Architecture information](http://www.intel.com/procs/servers/index.htm) on the world wide web (<http://www.intel.com/procs/servers/index.htm>). Click on Industry Alliances for Enterprise Computing, then click on Virtual Interface Architecture in the left hand column.

I₂O Technology

What's New:

- Industry Server Leaders Announce **Intel-based servers with I₂O[®] Technology**
(<http://www.intel.com/pressroom/archive/releases/io100797.HTM>)
- Intel's **New I₂O Web Site** Targeted at IT Managers with detailed Information
(<http://www.intel.com/procs/servers/i2otech/>)
- **Detailed I₂O Information** and Specifications Available at the I₂O SIG
(<http://www.i2osig.org/>)
- Industry Status (see below)
- What's New (see below)

Technology Description:

I₂O[®] technology revolutionizes the concept of intelligent I/O by providing an industry-accepted specification for the development of intelligent I/O solutions. The two primary objectives of the I₂O specification are to improve system-level performance by off-loading the host CPU of I/O tasks, and to enable the general portability of I/O device drivers across operating systems. The I₂O Architecture is a software specification that provides a standardized framework for the implementation of intelligent I/O subsystems. The concept of intelligent I/O was first introduced in mainframe systems to balance the I/O and compute power of the platform. Special "channel processors" were used to control I/O-specific tasks in these proprietary solutions.

The I₂O specification replaces the standard monolithic device driver with a two-piece driver model composed of the Hardware Device Module (HDM) and the OS Service Module (OSM). The HDM runs on the I/O processor (IOP) and serves as the interface to the target I/O device. The OSM runs on the host processor and serves as the interface to the host operating system. OSMs are developed for each I/O class defined by the specification, and are unique to each operating system. The HDM and OSM communicate over a *messaging layer* using a defined message-passing protocol. This de-couples both the underlying bus or interconnect topology and the HDM of the I/O device from the host OS. For a given device, a single HDM can be developed and used with any OS supporting the I₂O Specification. This model also provides the capability for direct communication between HDMs, thereby laying the foundation for peer-to-peer data transfers. In addition, it allows for stackable drivers, providing the capability to add functionality to standard devices, e.g. adding a third party's RAID firmware to any SCSI device driver.

Benefits to IT Community:

I₂O technology delivers improved system throughput as a result of incorporating an I/O processor that off-loads the host CPU of substantial I/O tasks. In addition, the I₂O technology is an essential part of increasing *scalability* in standard, high-volume (SHV) servers. The ultimate goal of scalable platforms is to provide unlimited ability to expand system resources and still produce proportionally greater performance. Once achieved, a scalable environment is clearly a big win for the IT community.

Another key benefit is the interoperability that I₂O technology provides. The split driver functionality of I₂O technology will simplify the task of integrating systems and managing the complex environments with multiple OSs and I/O technologies that are typically found in an enterprise.

Benefits to Manufacturers:

The I₂O Specification also brings the benefit of accelerating adoption of new I/O technologies, e.g. ATM, Fast Ethernet and Fiber Channel. By reducing the effort required to develop and maintain device drivers, more resources can be applied to I/O innovation. In addition, less time is spent by OEMs and IT departments testing and validating the multitude of peripheral cards and drivers that are certified with

any given platform. Once an HDM is validated to communicate properly with the messaging layer, it is then expected to work with all future versions of any OS that complies with the I₂O specification.

Industry Status:

Member companies are committed to proliferating the benefits of I₂O technology and are working together to ensure compliance as well as scalability. Intel and other industry IA server vendors announced products supporting the I₂O specification at the October '97 Network + Interop. The announcements included servers with I₂O technology and Intel i960[®] I/O processors for shipment during the next three months based on Intel Pentium[®] II and Pentium[®] Pro processors. These server systems vendors include: Acer America Corp.*, AST Computer*, Compaq Computer Corp.*, Dell Computer Corp.*, Gateway 2000*, Hewlett-Packard Co.*, IBM Corp.*, Micron Electronics, Inc.*, Mitsubishi Electric PC Division*, NEC Computer Systems Division*, and NCR*.

The development of the I₂O specification is an industry-wide initiative led by the I₂O Special Interest Group (SIG). Originally established in January of 1996 by a group of computer industry vendors (including Intel), it now has an active membership of over 120 companies. For more information on the I₂O Specification, SIG membership, access to the specification, or developments as an industry initiative, visit the **I₂O SIG* web site** (<http://www.i2osig.org/>)

Since the inception of the I₂O SIG in early 1996, membership in the SIG and product announcements have been growing at a significant rate. The industry saw the first demonstrations of I₂O technology at last year's Fall COMDEX. At this year's COMDEX there will be 22 vendors showing products and technology based on the I₂O specification. Intel has been playing a major role in the I₂O initiative, providing I₂O technology building blocks. These solutions include highly integrated I/O Processors (featuring an I₂O technology messaging unit, PCI-PCI bridge and embedded CPU based on the i960 processor) and server platforms featuring an Intel IOP and I₂O technology solutions.

Next Steps:

If you're involved in I/O hardware or software development, join the I₂O SIG and start investing in the technology that your customers will require. The I₂O Specification is available through the I₂O SIG web site, which also provides information on how to become a SIG member and gain access to the ongoing forums that provide invaluable guidance for your product development decisions.

If you are an IT manager or system administrator, familiarize yourself and your team with the concepts of the I₂O technology and consult with your equipment providers about how they plan to implement I₂O technology solutions in their coming products. The vendors who announced products at the October '97 Network + Interop will be shipping products by January '98 (see **press release** <http://www.intel.com/pressroom/archive/releases/io100797.HTM>). The I₂O SIG web site also contains interesting content for non-developers, including vendor announcements, SIG events and industry developments.

For more information:

Visit Intel's New I₂O web site targeted at IT managers with detailed information on I₂O technology (<http://www.intel.com/procs/servers/i2otech/>).

Visit Intel's Intelligent I/O Processor web site for developers including information on Intel's i960 RP I/O processor (<http://www.intel.com/design/iio/>).

Visit the I₂O Industry SIG web site (<http://www.i2osig.org/>).

Platforms: (continued)

Workstation Platforms

What's New

- **New 64-Bit Processor** Will Extend the Intel Architecture for Workstations—
Joint Intel/HP 64-Bit Instruction Set Disclosed at the Microprocessor Forum
(<http://www.intel.com/pressroom/kits/events/mpf1097.htm>)

Overview

Workstations based on Intel microprocessors have been very competitive at the entry level of the workstation marketplace. They are now demonstrating their power in the midrange and beyond with the Pentium® II processor (<http://www.intel.com/businesscomputing/wrkstn/PentiumII/index.htm>) and Pentium® Pro (<http://www.intel.com/procs/ppro/wrkstn/index.htm>) microprocessor. That's good news for any company that wants great workstation performance and open system architecture benefits at a fraction of the cost of traditional workstation systems.

Workstation users demand levels of performance that, until recently, could be delivered only by vendors competing on the basis of proprietary, vertically integrated solution “stacks” with little cross-vendor compatibility. Now, that situation is changing. A generation of workstations built around either single or multiple Intel Pentium II or Pentium Pro processors extends the value economics of the PC industry into workstations.

Intel has assembled a team of workstation experts in its new Workstation Products Division (WPD) to supply building blocks, technologies and programs to OEMs, IHVs and software developers to accelerate the development of the Intel architecture workstation market. System vendors (http://www.intel.com/procs/ppro/wrkstn/wks_sys.htm) and applications providers alike have been quick to embrace the Pentium II processor's computational muscle and the maturity of Windows NT* for workstation use.

Standard Architecture

The biggest benefit of a single architecture that scales from personal computers to workstations is maximum access to the innovations in both. For users, the new workstation industry provides high-performance with outstanding price/performance. It also contributes significantly to lowering the total cost of ownership (TCO) of workstation computing. In essence, more space and convenience to engineering, lower cost-per-resource to management, lower support costs, and less need for duplicate equipment.

High-Performance

At the heart of the new workstation architecture is Intel's Pentium II processor introduced in May 1997. The Pentium II processor, currently available in frequencies up to 300MHz, delivers the performance required for workstation applications. (For performance info please visit <http://www.intel.com/businesscomputing/wrkstn/PentiumII/perf/>)

Over the coming months you will continue to see exciting announcements in the area of workstation advancements based on the Intel architecture. These systems will possess all the key features you have come to expect from an engineering workstation, at an incredible price point:

- High-performance CPU
- Sophisticated 3-D graphics subsystems
- Built-in scalability
- Fast, highly expandable I/O, including advanced networking support
- Configurability to support hundreds of megabytes of RAM and terabytes of disk storage

At the October '97 Microprocessor Forum, Intel announced that the first member of its new family of 64-bit microprocessors, code named Merced™, is scheduled for production in 1999.

The processor, still under development, will extend the Intel Architecture with new levels of performance and features for servers and workstations. In addition, Merced processors will run all the software that currently operates on 32-bit Intel processor-based workstations. For more information on IA-64 and Merced, please visit the [Intel Microprocessor Forum site](http://www.intel.com/pressroom/kits/events/mpf1097.htm) (<http://www.intel.com/pressroom/kits/events/mpf1097.htm>).

Complete Solutions

A successful workstation is much more than a powerful processor. Intel is committed to continue working with other companies throughout the industry to ensure that all the technologies and products are in place to deliver optimal workstation solutions based on the Intel architecture.

For more information about [Intel Architecture based workstations](http://www.intel.com/businesscomputing/wrkstn/index.htm), please visit Intel's Workstation web site (<http://www.intel.com/businesscomputing/wrkstn/index.htm>).

Technologies:

Microprocessor Technology

What's New:

- New Pentium® II Processor **Developers Manual** Now Available
(<http://developer.intel.com/design/PentiumII/manuals/243502.htm>)
- Intel **Extends Family Of Mobile Processors** Bringing MMX™ Technology to Mini-Notebooks
(<http://www.intel.com/pressroom/archive/releases/MP102097.HTM>)
- **New 64-Bit Processor** Will Extend the Intel Architecture—
Joint Intel/HP 64-Bit Instruction Set Disclosed at the Microprocessor Forum
(<http://www.intel.com/pressroom/kits/events/mpf1097.htm>)
- Intel's Pentium II Processor Hits the Web—
Comprehensive **Consumer Marketing & Advertising Campaign** Kicks Off
(<http://www.intel.com/pressroom/archive/releases/CN091697.HTM>)
- Introduction of **New High-Performance, Low-Power Mobile Pentium Processor** with MMX
Technology Showcasing Intel's 0.25-micron process
(<http://developer.intel.com/design/mobile/>)
- **Pentium II Processors** Now Available for Business, Workstation, Consumer, and Server Platforms
(<http://www.intel.com/pentiumII/home.htm>)
- Industry Status (see below)
- Next Steps (see below)

Technology Description:

The Pentium II processor is the most advanced processor with Intel MMX technology. Delivering Intel's highest performance on the three vectors of computing—floating point, integer, and multimedia—the Pentium® II processor provides ample processing power for operating systems and applications such as business media, PC imaging, communications, and gaming.

The Pentium II processor is available in 233MHz, 266MHz and 300MHz versions for desktops, workstations and servers. The processor uses the high-performance Dual Independent Bus (DIB) architecture to deliver higher system bandwidth to complement its high processing power. The Single Edge Contact (S.E.C.) cartridge design includes a dedicated 512KB level two (L2) cache. The Pentium II processor also includes 32KB of level one (L1) cache (16K data, 16K instruction), twice that of the Pentium® Pro processor. Error Correction Code (ECC) memory is now available on the L2 cache. If enabled, this type of cache better enables servers and workstations to operate in business environments where data integrity and reliability are essential.

For more information visit the [Pentium II processor](http://www.intel.com/PentiumII/home.htm) home page (<http://www.intel.com/PentiumII/home.htm>). Or, for more detailed information please see the Pentium II processor [Technical Fact Sheet](http://www.intel.com/pressroom/archive/releases/dp5797fs.htm) (<http://www.intel.com/pressroom/archive/releases/dp5797fs.htm>).

Benefits to Users:

Together, systems designed with the Pentium II processor and the Accelerated Graphics Port (AGP) (<http://developer.intel.com/solutions/tech/agp.htm>) make multimedia software come alive. Greater processing power and video bandwidth allows for better 3D graphics, smoother textures, higher resolution, and smoother animation. All this allows for a more lifelike experience for realistic games, educational and hobby software. The Pentium II processor also enables new capabilities in PC imaging, video editing and playback, and audio re-mixing. Improved video performance also means crisper, clearer images for video playback and editing. Pentium II processor-based systems bring home rich and exciting PC entertainment experiences with new media technologies like host-based DVD (<http://developer.intel.com/solutions/tech/dvd.htm>).

In business, Pentium II processor systems are available for desktop, server and workstation platforms. The Pentium II processor family is fully compatible with previous generations of Intel Architecture processors. Both small and large businesses benefit from optimal performance with applications running on advanced operating systems such as Windows* 95, Windows NT* and UNIX*.

On top of its built-in Pentium® Pro processor technology base (Dynamic Execution and DIB architecture), the Pentium II processor takes advantage of software designed for Intel MMX technology. This technology enhances full-motion video playback, color depth, and provides more realistic 3D and graphics images, plus offers other media enhancements. Intel is now shipping the Pentium II processor with an Error Correction Code (ECC) level 2 (L2) cache. This type of cache better enables servers and workstations to operate in business environments where data integrity and reliability are essential.

At the October '97 Microprocessor Forum, Intel announced that the first member of its new family of 64-bit microprocessors, code named Merced™, is scheduled for production in 1999. The processor will be produced on Intel's 0.18 micron process technology, which is currently under development. The Merced processor will extend the Intel Architecture with new levels of performance and features for servers and workstations. Merced processors will run all the software that currently operates on 32-bit Intel processor-based machines. As IA-64 becomes established with the Merced processor, Intel will continue to expand its 32-bit product offerings. Larger cache memories, faster buses and continuing increases in core frequencies are among the features of the planned additions to today's Pentium II processor family slated for release in mid '98. In 1999, Intel's product offerings will span from 32-bit products for office, home and mobile users to the most powerful 64-bit products which will move Intel into new, higher-end workstations and server market segments. For more information on IA-64 and Merced, please visit the Intel Microprocessor Forum site (<http://www.intel.com/pressroom/kits/events/mpf1097.htm>).

Benefits to Manufacturers:

Whether you're developing today's most advanced hardware platforms or leading-edge multimedia software, Intel's Pentium II processor brings you Intel's highest performance processor to date allowing you to offer increased performance and capability to business and consumer users. To help you get your own products to market as quickly and reliably as possible, the Pentium II Processor Developers' web site (<http://developer.intel.com/design/PentiumII>) offers up-to-the-minute technical information—from product and platform specifications, tools, design guidelines, technology tutorials, related products, and programming and manufacturing support. Check back often for new design information.

Industry Status:

The Pentium II processor family supports the evolution of the PC platform in four important ways:

- 1) Dual Independent Bus architecture
- 2) Dynamic Execution
- 3) Intel MMX technology
- 4) Single Edge Contact (S.E.C.) cartridge

These technologies are bringing enhanced performance and capabilities to make visual computing possible on PCs today. Platforms for the business, consumer, workstation, and server market segments are all shipping today. Intel will continue to bring higher performing 32-bit microprocessors and complementary platform building blocks to enhance visual computing capabilities in the future.

Intel's new family of 64-bit microprocessors, code named Merced™, scheduled for production in 1999, will bring new levels of performance and features to new, higher-end server and workstation market segments while continuing to be fully compatible with today's applications running on the 32-bit Intel Architecture.

Next Steps:

Developers: Base your next PC design, whether it is a business desktop, workstation, consumer desktop, or server on the Pentium II processor, and for optimal performance, integrate the Intel 440LX AGPset (<http://developer.intel.com/design/agpsets/440/index.htm>).

For More Information:

Pentium II processor home page (<http://www.intel.com/PentiumII/home.htm>).

Pentium II processor developer information (<http://developer.intel.com/design/PentiumII/>).

Dual Independent Bus (DIB) Architecture (<http://www.intel.com/pentiumII/SPECS/dib.htm>).

MMX technology (<http://www.intel.com/pentiumII/SPECS/mmx.htm>).

Dynamic Execution (<http://www.intel.com/pentiumII/SPECS/dynamic.htm>).

S.E.C. cartridge packaging (<http://www.intel.com/pentiumII/SPECS/sec.htm>).

Pentium II processor performance (<http://www.intel.com/procs/perf/PentiumII/index.htm>).

Pentium II processor platform technologies
(<http://developer.intel.com/design/pentiumii/platform/index.htm>).

Intel's IA-64 and Merced information from Microprocessor Forum
(<http://www.intel.com/pressroom/kits/events/mpf1097.htm>).

Memory Technology

What's New:

- Intel Makes **100MHz SDRAM Specification** Widely Available
(<http://developer.intel.com/design/pcisets/memory/index.htm>)
- **Rambus Details Next-Generation**, High-Speed Memory Interface Targeted at Main Memory, Consumer Electronics and Communications Systems. Direct Rambus* Technology Sustains 1.5 Gbytes/sec per Device and Support Multiple DRAM Densities.
(http://www.rambus.com/html/oct_15__1997.html)
- At the Intel Developer Forum on September 30, **Rambus announced industry support** for Direct DRAM technology in 1999 and Introduced its New RIMM* Memory Module Package
(http://www.rambus.com/html/sep_30__1997.html)
- PC Platform **DRAM Technology Directions**
(<http://developer.intel.com/design/pcisets/rambus.htm>)
- Intel 440LX AGPset **Data Sheets** (66MHz SDRAM)
(<http://developer.intel.com/design/agpsets/440/index.htm>)
- Intel Makes Available AGP **Design Guide**
(<http://developer.intel.com/technology/agp/desguide/index.htm>)
- Industry Status (see below)
- Next Steps (see below)

Technology Description:

Intel's goal is to ensure that memory subsystems continue to support evolving platform requirements through 1998 and beyond. Mainstream memory bandwidth requirements will be satisfied by EDO and 66MHz SDRAM performance through the first half of 1998. Intel is also working with memory vendors to keep up with the performance of faster processors and bus architectures. For the past 12 months, Intel has worked with leading DRAM vendors to anticipate this need by developing 100MHz PC SDRAM Component and DIMM specifications. In the second half of 1998, the industry will see an adoption of 100MHz SDRAM to complement new, faster Pentium® II processors. Beginning in 1999, the PC platform will be enhanced by Direct RDRAM to further enhance the interactive lifelike visual experiences on the standard PC platform, including workstation-quality 3D graphics and consumer-quality video.

Benefits to Users:

The emergence of 3D and video applications and the evolution of the PC platform to the Visual Connected PC (<http://developer.intel.com/solutions/archive/issue1/focus.htm>) keeps evolving the PC architecture. New PC designs that will be based on faster Pentium II processors in mid-'98 are driving the need for ever-higher system memory bandwidth. Intel's leadership and industry participation are delivering new memory technologies which enable the development of higher performance PCs.

Benefits to PC Manufacturers:

Continuous work on PC SDRAM specifications helps PC manufacturers showcase platform performance and meet development targets for cost, availability and high-performance features. By working with the industry to develop PC SDRAM and DIMM specifications, Intel is helping to assure that memory products are built to support the next generation of platform requirements. Industry-wide compatibility helps PC OEMs line up multiple compatible DRAM suppliers to meet their cost and availability targets, while providing a high-quality product to PC end users.

Industry Status:

Intel's goal is to ensure that memory subsystems continue to support evolving platform requirements and to assure that memory does not become a bottleneck to system performance. It is especially important to assure that the PC memory roadmap evolves together with the performance roadmaps for the processors, I/O and graphics. To meet this goal, Intel has worked for the past 12 months with leading DRAM vendors to develop 100MHz PC SDRAM Component and DIMM specifications that are now available on Intel's developer web site (<http://developer.intel.com/design/pcisets/memory/index.htm>). In addition, Intel participates in ongoing industry dialog to assure that memory suppliers get their technical questions answered.

Intel's role is to work with the memory industry to project future requirements, evaluate technology options, to help choose a path with adequate lead time and then to facilitate communication leading to a complete platform memory solution. This process achieved solid results beginning in 1994, with the introduction of PBSRAM technology for L2 cache. In 1994–1995, EDO DRAM was supported by the Intel 430FX PCIsset to achieve major performance improvements on the Pentium® processor. In 1996, the Intel 430VX PCIsset supported 66MHz EDO and SDRAM. Intel's newest chip set, the Intel 440LX AGPset (<http://developer.intel.com/design/agpsets/440/index.htm>), supports current platform requirements with 66MHz SDRAM. Intel continues to support the memory industry with system-level simulation tools and design capability to assure OEMs and users have the right products at the right time.

On September 29, Intel held the first Intel Developer Forum focusing on the tools and technical training necessary to implement the latest technologies. Intel provided a memory technologies track where its top architects discussed 100MHz SDRAM platform implementations for 1998, and Rambus was on hand to discuss Direct RDRAM for 1999.

Next steps:

Intel has delivered the PC SDRAM Component Specification, as well as the Serial Presence Detect and 100MHz DIMM specifications to major vendors and OEMs. These specifications are now available on the Intel developer web site. They provide all the information needed to develop memory modules to support the latest Intel platforms through 1998.

The next step in the memory roadmap is Direct RDRAM. Intel and Rambus are working together to extend Rambus technology to meet PC platform memory requirements for 1999 and beyond. On October 15, 1997 Rambus announced the details of its next-generation, high-speed memory interface. Developed in conjunction with Intel and in cooperation with other Rambus semiconductor partners, Direct Rambus technology is gaining broad industry support. More than a dozen DRAM companies, including the world's top 10 DRAM makers, have announced their intention to develop Direct RDRAM products. And in September, 18 companies representing the leaders in system-memory implementation products--including memory modules, connectors, clock chips and test systems--announced their intention to support Direct Rambus technology. Planned applications include computer system memory, multimedia and graphics memory, communications system memory and consumer electronics memory. For more details on the Rambus announcement please visit the Rambus press release (http://www.rambus.com/html/oct_15__1997.html).

For more information:

Revisit this page often for the latest details on Intel platform support services and future information on Direct RDRAM.

AGP Technology

What's New:

- Intel Announces the **Intel Performance Evaluation and Analysis Kit (IPEAK)**, a New Line of Performance Analysis Tools Including a Tool for **Graphics and AGP** Performance Analysis (<http://developer.intel.com/design/ipeak>)
- **First AGP Chip Set**, the Intel 440LX AGPset, Now Available (<http://developer.intel.com/design/agpsets/440/index.htm>)
- Visit Intel's **New AGP Web Site** for In-Depth Technical Information (<http://developer.intel.com/technology/agp/index.htm>)
- **AGP Design Guide** Now Available (<http://developer.intel.com/technology/agp/desguide/index.htm>)
- Industry Status (see below)
- Next Steps (see below)

Technology Description:

The Accelerated Graphics Port (AGP) is a new interface on the PC platform which enhances high-performance graphics and full-motion video on mainstream PCs. The AGP interface, positioned between the PC's chip set and graphics controller, enables the graphics controller to use system memory for graphics data (e.g., texture maps) through a dedicated high-speed, low-latency connection. This high-performance capability permits the graphics controller to do texture mapping in a single-step process. Prior to AGP, graphics controllers were required to use a two-step process that involved retrieving texture data from system memory via the PCI bus and storing it in special purpose local graphics memory before it could be used. In short, AGP improves graphics performance two ways. First, with a peak transfer rate of 528MB/s, it greatly increases bandwidth of PCI. Second, it helps to alleviate the cost pressures associated with a growing need for local graphics memory by using system memory instead. In addition, AGP lays a scalable foundation for high-performance graphics—future enhancements will bring its peak bandwidth to over 1GB/s. Not only does AGP improve 3D graphics, but its greater bandwidth is a key enabler for full-motion video on the PC. AGP is implemented with a unique connector for graphics accelerator cards, and requires an AGP-compatible graphics card or chip, chip set, BIOS, and motherboard. The AGP specification has been led by Intel and is open to any and all industry players. AGP is a key element in making Intel's Visual Computing Initiative a reality. (See the focus section in Issue 1 of *Platform Solutions* <http://developer.intel.com/solutions/archive/issue1/focus.htm>).

Benefits To Users:

AGP is delivered via Intel's 440LX AGPset in combination with Intel's Pentium® II processor and its Dual Independent Bus (DIB) architecture. In addition to arcade-quality 3D games, consumers can expect entirely new classes of applications to be enabled by AGP, such as 3D reference works and interactive video titles. Business users will also see new types of applications resulting from AGP, such as 3D data visualization and interactive 3D web applications. AGP will also improve the overall performance of the PC. The DIB architecture of the Pentium II processor allows the CPU and the graphics subsystem to work concurrently, thus greatly speeding up the processing done by both. And more importantly, by taking graphics and video traffic off the PCI bus, that bus can be used more efficiently by other devices, such as 100 Mb/s network adapter cards.

Benefits To Manufacturers:

AGP takes PCs to a new level of performance. Exciting arcade-quality games and new classes of applications promise to grow the overall market for PCs, peripherals, and software. By providing a dedicated, high-speed pathway between the graphics controller and system memory that matches the

processing power of the Pentium II processor, AGP balances the overall performance of the Intel Architecture PC platform. PC OEMs can build systems that more fully realize the potential of the Pentium II processor, and graphics hardware vendors can build products that are no longer constrained by the limited bandwidth of the PCI bus. AGP is a scalable solution so graphics performance will improve in line with performance increases of the Pentium II processor.

Industry Status:

Intel initiated the development of AGP technology and organized the AGP Implementors Forum with industry leaders. The AGP-IF is open to all PC industry players and now has over 130 members, including industry leaders in graphics controllers, systems, and software products. As a result of Intel's leadership, AGP technology has matured and many of these companies are now bringing products to market. In the second half of 1997, PC OEMs began offering AGP-enabled systems based upon Intel's Pentium II processor and the Intel 440LX AGPset. A number of other vendors have already announced graphics chips and cards that leverage AGP technology for advanced 3D graphics.

The week of October 7, Intel organized the second AGP Plugfest industry event held in Taiwan. Like the first AGP Plugfest in June, its goal was to ensure full compatibility of industry designs worldwide. The second AGP Plugfest was just as successful as the first one with over 150 developers in attendance testing their AGP platforms and peripherals for compatibility. At the event Intel showcased its new Intel Performance and Evaluation Kit (IPEAK) (<http://developer.intel.com/solutions/tech/ipeak.htm>) tools for graphics to be available in Q1 '98. The IPEAK Graphics Toolkit currently consists of two tools that help OEMs and IHVs analyze and improve the performance of their graphics solutions. The *Graphics Performance Toolkit* provides a better understanding of the performance issues and limitations related to graphics hardware and applications. And the *Baseline AGP System Evaluation Suite* is a system integration and validation tool that provides the capability to test and evaluate AGP system-level functionality and utilization.

AGP was also covered in the Desktop Graphics and I/O Technologies track at the Intel Developer Forum (IDF) on September 29. At the IDF, attendees had direct access to Intel's AGP technology architects who trained them on the memory management mechanisms and high-performance usage of AGP as well as performance analysis and tuning using the IPEAK Graphics Toolkit. For an overview of IDF and for future information on the February '98 IDF, please visit the IDF web site (<http://developer.intel.com/intel/idf>).

Beyond the hardware platform, numerous entertainment, educational, and business-oriented software applications that take advantage of AGP are under development by industry software vendors. Microsoft* has also announced support for AGP using DirectX* 5.0, Windows* 98, and Windows NT* 5.0. To speed the availability of AGP-enabled systems and software, Intel has made a virtual device driver immediately available to the industry. For information on this driver, please visit the AGP Implementors Forum web site (<http://www.agpforum.org/>).

Next Steps:

PC OEMs—To deliver high performance PCs to your customers be sure to choose the Intel Pentium II processor and Intel 440LX AGPset. OEMs should start developing AGP systems now in order to take advantage of the surging momentum behind AGP technology.

Graphics chip and card vendors—Get AGP-compliant products to market in time for the release of AGP PCs at the end of 1997 and beginning of 1998.

Software developers—Now is the time to develop exciting new applications that take advantage of AGP technology. Create apps with rich, lifelike textures to take advantage of the many AGP-enabled PC systems and cards entering the market in late 1997 and early 1998.

For More Information:

Visit Intel's new AGP home page (<http://developer.intel.com/technology/agp/index.htm>) for more detailed information on AGP and a tutorial explaining AGP functionality at the system level.

Visit the [AGP Implementors Forum home page](http://www.agpforum.org) (<http://www.agpforum.org>) for more development, product and event information. There you can find the AGP specification and design guides.

Visit the [Platform Performance Tuning technology page](http://developer.intel.com/solutions/tech/ipeak.htm) for more information on Intel's IPEAK Graphics Toolkit to be available in Q1'98 (<http://developer.intel.com/solutions/tech/ipeak.htm>).

DVD Technology

What's New:

- **Successful DVD Developer Conference.** Intel and the Software Publishers Association hosted a conference on October 29th that provided development guidelines, tools and solutions for the industry to bring more compatible DVD Interactive titles to PCs
(<http://www.intel.com/pressroom/archive/releases/IV102997.HTM>)
- Download the **new DVD white papers** provided at the DVD Developer Conference:
(<http://developer.intel.com/solutions/tech/dvd.htm>)
 - * **MCI recommended command set** for DVD title development under Windows* 95
 - * **DVD interactivity white paper** showing transition of MCI commands to DirectShow*
- Check out Intel's **DVD activities at Comdex:**
 - Intel and other industry representatives discuss DVD on the PC at the DVD panel on November 18
 - See examples of host-based DVD playback solutions at the Intel booth in Room LN109
 - Two sessions for the press about "DVD on the PC" on Nov. 19 (visit the Intel press room)
- Read the top story in this month's *Platform Solutions* on "**Host-based DVD: Arriving on PC Platforms Today,**" by Rajesh Shakkarwar, Intel's DVD Technology Development Manager
(<http://developer.intel.com/solutions/issue/stories/top5.htm>)
- Download the **DVD white papers** provided at the Intel Developer Forum on September 29:
(<http://developer.intel.com/solutions/tech/dvd.htm>):
 - * Copy Protection Licensing Requirements for the **CSS DVD Method**
 - * **Tamper Resistant Software: An Implementation**
 - * Implementation of a **High-Quality Dolby* Digital Decoder** Using MMX™Technology
- Intel's **DVD Authoring Studio** in Hillsboro, Oregon provides independent software vendors (ISVs) with access to a state-of-the-art DVD authoring facility
(http://developer.intel.com/drg/hybrid_author/DEVLAB.HTM)
- DVD is now a part of the **Open Arcade Architecture**
(<http://developer.intel.com/drg/news/coinop/index.htm#toc>)
- Industry Status (see below)
- Next Steps (see below)

Technology Description:

DVD is a new optical storage technology that stores digital information on discs which are similar in size and appearance to CD-ROMs. DVD discs can contain a combination of audio, video, and computer data, and have been designed for use in both the home entertainment and PC environments. By using 50% smaller "pits" to hold data, a DVD disc can currently hold seven times as much information as a conventional CD-ROM. Future DVD discs will be double sided and double layered, allowing four times again as much data to be stored (up to 17GB).

DVD technology has been under development for several years, and five different variations have arisen to meet the needs of different types of users:

- *DVD-Video* - Read-only storage intended for the playback of entertainment content, such as movies, on consumer DVD players connected to a TV or on DVD drives in a PC.
- *DVD-ROM* - Read-only storage intended for PCs. Essentially a much larger CD-ROM. Can store video, audio, images and graphics in any format. Ideal for interactive software such as games, reference materials and other data intensive applications.
- *DVD-R (Recordable)* - Write-once, read-many storage. The target usage model includes archiving, software development and low-volume data distribution.
- *DVD-RAM* - Write many, read many storage. Example applications include short-term archiving, software development and media recording.
- *DVD-Audio* - This format focuses on music and other forms of audio-only content. A number of technical issues remain to be resolved, including encoding and copy protection.

Consumer electronics companies are currently producing DVD-Video players to be used primarily for playing movies on televisions. PC-based DVD playback, however, can support all of the DVD formats ushering in a broader array of applications, including interactive titles, archiving and movies. PC DVD drives are also backwards compatible and will play existing CD-ROM titles and CD audio recordings.

DVD-ROM titles for the PC can be encoded in a variety of different formats (e.g., Indeo® video, MPEG1, MPEG2, Cinepak*), whereas DVD-Video titles for home entertainment are generally restricted to MPEG2 video and AC-3 or Linear PCM audio. The range of encoding formats on PC DVD lends itself to flexible solutions which perform decoding in software rather than with dedicated hardware. PCs based on Intel's Pentium® II processor are especially well-suited for software, or host-based, playback of DVD content utilizing the power of the microprocessor instead of costly add-in hardware.

Due to the ease with which digital content can be replicated, copy protection has been an important issue in the development of DVD technology. Intel has worked closely with Hollywood studios and the electronics industry to define copy protection solutions that are suitable for both the consumer electronics and PC industry. Intel has made available a copy protection CSS white paper at the top of this page.

Benefits To Users:

DVD promises to offer consumers a new level of visual computing (<http://developer.intel.com/solutions/archive/issue1/focus.htm>) experience on their PCs. Users can come to expect the following benefits from DVD technology:

- *Huge storage capacity* - Today's applications requiring multiple CD-ROMs (e.g., *WingCommander II**) can be consolidated onto a single DVD-ROM disc.
- *Incredible quality* - With DVD, consumers will be able to experience theater-quality video and audio on their PC.
- *Rich interactivity* - The large capacity of DVDs combined with the processing power of the PC will enable software vendors to create applications that provide visually rich, interactive experiences for end-users.
- *Convergence* - DVD video discs will play on both set-top players and PCs.
- *Backward compatibility* - DVD drives can play existing audio CDs and CD-ROMs.

Benefits To Manufacturers:

DVD technology promises to benefit a wide array of industries and companies. PC OEMs will be able to deliver a more interactive and media-rich experience to end users. Solutions that use both dedicated hardware for playback, as well as host-based software playback, on PCs are already available today. Software providers will be able to create new titles that integrate full-motion video, high-quality audio, graphics and images. In the near term, they can consolidate multi-CD titles onto a single DVD. Drive manufacturers stand to see increased business as the momentum behind DVD builds and sales of PC DVD drives explode. CD drive and disc manufacturers can leverage their existing manufacturing technology to make DVD products.

Industry Status:

All major consumer electronics companies have released or announced DVD-Video players. Moreover, most major Hollywood studios support the medium and have begun releasing movies on DVD. At least 150 titles are shipping today and over 350 titles are expected by the end of 1997. In the PC market, the first DVD-ROM drives for computers began shipping in April of this year. PC OEMs are integrating DVD drives into their product lines today. Higher-end solutions will rely on hardware solutions for de-scrambling and decoding functions, but a few OEMs have already announced host-based solutions that utilize the Pentium II processor. The more cost-effective host-based DVD playback solution on Pentium II processor-based platforms will allow DVD on the PC to reach mainstream price points by the second half of 1998. In addition, the software industry is making a concerted move to DVD-ROM, with over 50 interactive titles expected by the end of 1997. The DVD-R and DVD-RAM specifications are complete but products are not yet available. Recently, several companies (Sony*, Phillips*, and Hewlett-Packard*) have announced an alternative format to DVD-RAM called DVD+RW. The DVD-Audio specification is still under development and products are not expected until 1999.

Intel has been working with the PC and consumer electronics industries on DVD technology diffusion for over two years. **Intel and the Software Publishers Association hosted a DVD Developer Conference on October 29**, providing development guidelines, tools and solutions to bring more compatible DVD interactive titles to PCs. The conference was a success with over 220 attendees from a variety of industries hearing presentations from Intel, the SPA and others involved in DVD technology development. Also provided was a product showcase, a DVD developers case study, and product compatibility testing with 20+ software/content developers. Daikin* announced the first Intel Architecture-based Windows NT* DVD authoring tool as an important step in bringing low-cost authoring to a larger customer base. And two important new white papers were provided by Intel and the SPA to enable compatible DVD interactive title development in support of MCI and DirectShow*:

- **MCI recommended command set** for DVD title development under Windows* 95
- **DVD interactivity white paper** showing transition of MCI commands to DirectShow

To view some of the presentations given at the DVD Developer Conference, please visit the **SPA web site** (<http://www.spa.org/dvd/oct.htm>).

Intel also hosted the first **Intel Developer Forum (IDF) on September 29**, providing a day-long training track for OEMs and IHVs on implementing host-based DVD playback on Pentium II processor-based PC platforms. PC and peripheral developers from around the world received detailed presentations and tools, as well as direct access to Intel's top PC DVD architects. For an overview of the IDF DVD training track, please visit the **IDF web site** (http://developer.intel.com/intel/idf/abstract/host_dvd.htm). DVD white papers were also provided and are now available for download at the top of this page.

Next Steps:

- **PC OEMs** - Download the new DVD white papers from the DVD Developers Conference and the Intel Developer Forum and become familiar with DVD implementation. Begin to include DVD hardware in your PC designs and start preparing for host-based DVD in your platform designs for 1998.
- **Software Developers** - Download the new DVD white papers provided at the DVD Developers Conference and the Intel Developer Forum to ease development of compatible interactive titles for the PC. Start porting multi-CD titles to DVD-ROM. More importantly, begin developing new titles that incorporate full-motion video, high-quality audio, images and 3D graphics. Visit Intel's DVD Authoring Studio for assistance with getting your title on DVD.
- **Studios** - Continue the transition to the DVD format. Expand the collection of titles on DVD.

For More Information:

Understand DVD's role as a key ingredient of the *PC 98 System Design Guide* (<http://developer.intel.com/design/PC98/index.htm>).

Intel's DVD Authoring Studio in Hillsboro, Oregon, provides independent software vendors with access to a state-of-the-art DVD authoring facility that allows them to do software layout, testing and pre-mastering of DVD content (http://developer.intel.com/drg/hybrid_author/DEVLAB.HTM).

The DVD FAQ is a good source of more detailed information about DVD (<http://www.videodiscovery.com/vdyweb/dvd/dvdfaq.html>).

One stop shopping for DVD information on the web (<http://www.unik.no/%7Erobert/hifi/dvd/>).

Software Publishers Association information on DVD-ROM (<http://www.spa.org/dvd/default.htm>).

MPEG Organization DVD Resources (<http://www.mpeg.org/~tristan/MPEG/dvd.html>).

DVD and Microsoft* O/S web site (<http://www.microsoft.com/hwdev/devdes/dvdwp.htm>).

Stay tuned to this *Platform Solutions* DVD technology page for the latest news about DVD on the PC platform.

Audio Technology

What's New:

- Intel Announces **version 2.0 of Audio Codec '97** (AC '97) specification (<http://developer.intel.com/pc-supp/platform/ac97/>)
- Intel Announces **Audio'98**—Press Release, April 1997 (<http://www.intel.com/pressroom/archive/releases/CN40797C.HTM>)
- **Audio 98 Roadmap** Now Available (<http://developer.intel.com/pc-supp/platform/aud98/audio98.htm>)
- New **USB Audio Application Note** available for download (<http://www.intel.com/design/usb/applnots/292206.htm>)
- Industry Status (see below)
- Next Steps (see below)

Technology Description:

Increasing processor performance, integration of functionality and external expansion buses are among the major trends currently transforming PC audio. As processor performance increases, more functionality is accomplished in software. This is an industry-wide trend and can be observed across all platforms and CPUs. Hardware faces competition with software-only implementations and needs to demonstrate a functionality, performance or quality advantage. However, for high-performance 3D computing and gaming platforms, hardware acceleration will continue to be desirable. As the attach rate for a function goes up there is more incentive for integration onto the system motherboard or even into the Super-I/O or chip set logic. This is also an observable industry trend. External expansion buses offer PC OEMs system design and configuration flexibility, and offer PC customers user-friendly upgrades. The gradual replacement of ISA add-in cards with USB (<http://developer.intel.com/solutions/tech/usb.htm>) is under way, and IEEE 1394 (<http://developer.intel.com/solutions/tech/1394.htm>) is also expected to gain momentum within the next couple of years. The transition to external digital audio is expected to be gradual because initial implementations will probably appear first at the mid- to high-end PCs and cost more than highly integrated motherboard audio solutions. Intel is providing the industry with recommendations and supporting data on hardware vs. software partitioning. Intel is very involved in each of these areas and the Audio '98 roadmap document (<http://developer.intel.com/pc-supp/platform/aud98/audio98.htm>) helps clarify the transitions and what the industry is doing for 1998.

Benefits to Users:

The main benefit to users is that they will get much higher quality audio solutions with several key new features that have not been possible before. 3D positional audio will bring new levels of realism to games with sounds being positioned interactively around the user, making them truly part of the 3D virtual experience. The user will also get much better music reproduction with MIDI utilizing Wavetable synthesis.

Benefits to Manufacturers:

Audio has become a very important and highly visible part of today's PC experience. With the arrival of very high quality built-in audio components and external digital connectivity, the quality of the PC audio experience will rapidly become a function of the PC customer's budget for audio peripherals. The growing diversity of PC audio requirements, platform segments, and buses forces all industry players to acknowledge that there is more than one right way to implement audio. Upcoming operating system releases are expected to fully support external digital audio peripherals and emerging digital consumer electronics connections, increasing system flexibility and scalability on the high end. By 1998, Intel expects digital extensions to the baseline system audio will emerge based on USB and IEEE 1394 specifications: USB for PC audio peripherals, and IEEE 1394 for connections to digital CE. AC '97, USB,

and 1394 should be viewed as overlapping yet complementary specifications that provide OEMs with more opportunities to address a wider range of platform implementations. Intel expects that the majority of PCs in 2H98 will support analog connectivity. But in the end, it is the PC OEM who is in the best position to determine whether a SoundBlaster* compatible, Digital-Ready, or Digital-Only audio solution satisfies the customer's needs.

Industry Status:

Intel worked with the industry to develop the original AC '97 specification in 1996. Many new audio products are now shipping that support AC '97. PCI (AC '97) audio products will be shipping in volume in the first half of 1998 time frame. With the introduction of Windows* 98 and WDM audio, USB audio devices will be enabled and shipping. The audio quality that AC '97 provides is a key enabler of DVD (<http://developer.intel.com/solutions/tech/dvd.htm>) content, as well as software-driven three dimensional audio technologies such as Intel's recently announced Realistic 3D Sound Experience (RSX) technology. Based on extensive feedback from leading industry audio chip and peripheral vendors, and PC manufacturers, the Audio '98 roadmap highlights the technical ingredients to deliver audiophile-quality audio to the PC.

At the Intel Developer Forum (IDF) in September Intel released a version 2.0 update to the Audio Codec '97 specification. The new spec is intended to augment the existing AC '97 version 1.03 specification rather than replace it. AC '97 rev. 2.0 defines new extensions supporting high-quality audio (like that from DVD), and extensions for modem and docking to help both desktop and mobile manufacturers adopt these features more quickly and cost-effectively. The specification can be downloaded from the Intel developer AC '97 web site (<http://developer.intel.com/pc-supp/platform/ac97/>).

At IDF Intel also discussed the implications of audio implementations with the PC 98 System Design Guide. IDF presentations from Intel's top architects for the PC 98 training tracks are available on Intel's PC 98 web site (<http://developer.intel.com/design/pc98/#IDF>).

Next Steps:

OEMs and IHVs: The time has come to start moving away from Legacy ISA audio to new PCI/AC '97 audio for the new features that it will only be able to deliver. All 2H97 products should support AC '97.

E-mail Audio97@intel.com to add your name to the Audio '97 mailing list to receive periodic updates.

Come back to the Audio technology *Platform Solutions* news page for future information on AC '97 and Audio 98.

Stay tuned to this page and the IDF web site (<http://developer.intel.com/design/idf/>) for information on the next IDF coming in February 1998.

For More Information:

For more background information (white papers and specifications) go to Intel's AC '97 web site (<http://developer.intel.com/pc-supp/platform/ac97/>).

For technical presentations on audio and other PC 98 training tracks from the September '97 Intel Developer forum visit the PC 98 site at (<http://developer.intel.com/design/pc98/#IDF>).

For more information on the Audio '98 Roadmap go to (<http://developer.intel.com/pc-supp/platform/aud98/index.htm>).

For more information on USB Audio, download the USB Audio Application Note (<http://www.intel.com/design/usb/applnots/292206.htm>).

USB Technology

What's New:

- Intel Launches **USB Hub Monitor Solution**, New 8x931 Single-chip Controllers (<http://www.intel.com/design/usb/8x931a.htm>)
- **Q&A with Intel's USB experts** in Issue 1 of *Platform Solutions* (<http://developer.intel.com/solutions/archive/issue1/stories/USB.htm>)
- **New USB Products Arriving on the Market** (http://developer.intel.com/design/usb/new_pcs.htm)
- **USB Mobile Design Guide** Available for Download (<http://test.intel.com/design/usb/designex/usbgl10.htm>)
- **USB Audio Application Note** Available for Download (<http://developer.intel.com/design/usb/applnnts/292206.htm>)
- Industry Status (see below)
- Next Steps (see below)

Technology Description:

Universal Serial Bus (USB) is the easier to use and flexible interconnect specification that enables instant "outside the box" Plug and Play peripheral connectivity. It allows users to add peripheral devices without expensive add-in cards or configuration headaches such as DIP switches and IRQ settings. A single connector type simplifies connection of all USB-compliant devices, including telephony peripherals, video phones, digital cameras, scanners and monitors in addition to joysticks, keyboards and other I/O peripherals. USB's hot attach/detach capability lets users add and remove devices without turning off their PC. USB also distributes power to peripheral devices and employs a hub architecture that allows as many as 127 different devices to be connected simultaneously.

USB is a key enabling technology for emerging PC initiatives including PC Imaging and Computer Telephony Integration (CTI). Moreover, the connectivity needed to support Intel's Visual Computing Initiative (<http://developer.intel.com/solutions/archive/issue1/focus.htm>) may now be attained without the need for add-in card solutions.

For more details, visit Intel's USB home page (<http://www.intel.com/design/usb/>).

Benefits to Users:

USB expands the PC experience by enabling a new dimension of configuration freedom and interactivity. The absence of add-in cards and power supplies also helps reduce overall system cost. USB is easier to use and allows users to instantly reconfigure their systems "on the fly" by plugging and unplugging devices. Because USB enables both isochronous and asynchronous data transfers, it has the capacity to enrich the user's ability to control peripherals, such as audio speakers, from the PC. The ease of device sharing makes PCs more manageable for users of home and business PCs.

Benefits to Manufacturers:

USB is an open, royalty-free specification which has received broad industry acceptance. USB's ease of use and relatively low cost are expected to support the continued expansion of the PC peripherals market into new and fast-growing areas such as digital imaging, integrated telephony and interactive multi-player games. Absence of add-in cards and, in many cases, external power supplies also simplifies product design and helps reduce costs. Fast time-to-market development solutions are available now from Intel and other suppliers.

Industry Status:

USB technology is in full-swing implementation. Most new PCs introduced in 1997 are shipping with live USB ports, ready to connect to USB-compliant devices. Many USB devices are now arriving on the market, and hundreds of USB peripheral products are slated for release in 1997 and 1998.

Intel has just announced the new single-chip 8x931Hx Universal Serial Bus (USB) hub controller and the new 8x931Ax USB hubless controller to complement the Intel family of integrated USB products. Hub monitors play a central role in implementing the virtually unlimited peripheral connectivity potential of USB. Intel expects the demand for "smart" USB hub monitors on Windows* 95 platforms to grow as users experience the benefits of USB. Intel is helping developers prepare with a comprehensive one-stop solution that includes a Win32 Driver Model monitor driver, USB Monitor class and Human Interface Device (HID) class-compliant APIs, an On-Screen Display (OSD) applet, Intel 8x931 and 8x930 USB hub controllers and HID-compliant firmware, Intel 8x931 and 8x930 USB hub reference board hardware schematics and application notes.

Intel also offers assistance for developers in the areas of systems integration and validation testing through its Peripheral Integration Laboratories and Systems Integration and Validation (SIV) program.

Next Steps:

Peripheral Developers—Once they get their hands on USB, PC users may never let go. Now is the time to develop USB-compliant products, so you will be ready to meet this growing level of consumer awareness.

System Developers—Designing with PCIs that support USB and the OEM release of Windows* 95 will help position you to meet the anticipated consumer demand for "device-ready" USB-compliant PCs. Be sure to visit Intel's USB home page and the USB Implementers Forum home page for the design information, developer support and product information you need.

For More Information:

Q&A with Intel's USB experts, Steve Whalley and Bala Cadambi, in Issue 1 of *Platform Solutions* (<http://developer.intel.com/solutions/archive/issue1/stories/USB.htm>).

See Intel's USB home page for the latest developer resources and design tools (<http://www.intel.com/design/usb/>).

Visit the USB Implementers Forum home page for information on development support, products and events (<http://www.usb.org>).

1394 Technology

What's New:

- Intel delivers **keynote at the October 1394 Trade Association meeting** in Phoenix, Arizona. Jim Pappas, Director of Technology Initiatives at Intel, outlined the role 1394 will play in the future of the PC. **Download the presentation at.**
(<http://developer.intel.com/solutions/tech/1394.htm>)
- Presentations given at the 1394 Trade Association Developers Conference in San Jose, California in July show Intel's commitment to 1394. Download them here.
(<http://developer.intel.com/solutions/tech/1394.htm>)
 - * Intel presents its **commitment to 1394**
 - * Intel describes its proposal for **digital content protection over 1394**
- Industry Status (see below)
- Next Steps (see below)

Technology Description:

IEEE 1394 is a video-speed serial interconnect that is now an IEEE standard. Like USB, 1394 enables plug-and-play peripheral connectivity, provides power to peripherals helping to eliminate each one having its own power supply, and supports isochronous data transfers. 1394, however, takes these capabilities to video speeds. USB and 1394 serve different needs which will remain and coexist for the foreseeable future. Peripherals that do not require the high data transfer rates possible with 1394 will remain with USB. Eventually, PCs will need only USB and 1394 serial ports to handle all I/O, dramatically simplifying life for PC users.

The consumer electronics industry is already shipping digital camcorders, digital still image cameras, digital satellite receivers and digital VCRs all with 1394 interfaces. 1394 is the physical bridge that makes the convergence of consumer electronics and PCs possible. Existing products support 1394 protocols at 100 and 200 Mbps, with 400 Mbps products shipping in 1998. The 1394 road map extends to speeds at 800, 1600 and 3200 Mbps.

1394 also provides the storage industry with a PC interconnect to follow on IDE and the printer industry to replace the parallel port. Because 1394 can handle very high data rates, it encourages peripherals to transmit more "raw" data to the PC for host-based processing, which can significantly reduce the cost of some peripherals like digital still cameras. 1394 is important not only for connectivity to new digital consumer electronics devices, but also for core PC peripherals as they move to higher data rates.

In conjunction with USB, 1394 makes possible new "modular" approaches to PC architecture with the modules tied together with two serial buses. The proposed Device Bay Specification (<http://www.device-bay.org/>) is an excellent example of the great new applications enabled by 1394 (and USB), in this case providing peripheral modularity.

Benefits to Users:

One promise of 1394 is a significantly enriched PC user experience. Users will be able to use their PCs to control consumer electronics and PC peripherals, edit audio/video content, link peripherals to the Internet, and much more. 1394 will bring the PC to the family room to provide entertainment, gaming, and learning experiences not possible today.

Modular PCs will allow users to buy as little or as much PC as they like and to upgrade their PCs selectively, at will and painlessly. A PC system becomes more like a component stereo system, with 1394 playing the role of a digital RCA connector.

Benefits to Manufacturers:

Because it is plug-and-play, 1394 confers all the same benefits as USB to manufacturers in terms of ease-of-use and reduced customer support requirements. The user never needs to open the box. Because 1394 enables users ready access to rich digital content, it will make the PC more attractive, thereby driving revenues. The modularity offered by 1394 (in conjunction with USB) offers PC manufacturers a greatly simplified manufacturing process and lower inventories in both the factory and in the field. Peripheral manufacturers benefit from compliance to a single industry standard supported by both the consumer electronics and computer industries, allowing in many cases the same SKU to be sold into both markets.

Industry Status:

IEEE 1394.1995 is in production today in consumer electronics equipment. An enhancement, called 1394.A, is expected to go to the IEEE for balloting in 1997. The industry is actively working on closing the definition of 1394.B, which will define 1394 at speeds of 800 Mbps and beyond. Intel expects some 1394-enabled PCs to be available by the end of 1997 and processor chip sets supporting the 1394 Open Host Controller Interface to be available in 1998.

The transfer of copy-protected video is a very hot topic and important to the movie industry. Intel has proposed a digital content protection method to the 1394 Trade Association that is available now for review.

Next Steps:

PC system vendors and peripheral manufacturers: make plans now to support 1394 ports on your future systems if you haven't already. Everyone, including consumer electronics manufacturers: ensure your 1394 interfaces are defined in compliance with the IEEE specifications and 1394 Trade Association guidelines to ensure interoperability.

For More Information:

Contact the [1394 Trade Association](http://www.1394ta.org) site for more information on 1394 and links to many other 1394-related sites (<http://www.1394ta.org>).

Instantly Available PC Technology

What's New:

- Intel power management architect Gary Solomon describes the ins and outs of the **new Instantly Available PC** in Issue 2 of *Platform Solutions*
(<http://developer.intel.com/solutions/archive/issue2/stories/top2.htm>)
- Just Released; the **Instantly Available PC Power Management Design Guide**
(<http://developer.intel.com/design/power/pcpower.htm>)
- **Power Supply '98 Introduced**—New Dual Mode Power Supply Specification (press release)
(<http://www.intel.com/pressroom/archive/releases/CN92997A.HTM>)
- Download the latest **Power Supply '98 Specification**
(<http://developer.intel.com/design/power/supply98.htm>)
- A Complete List of **Power Management Specifications** for the Instantly Available PC
(<http://developer.intel.com/ial/powermgm/specs.htm>)
- **PCI-Power Management Specification** Available for Download
(<http://www.pcisig.com/pm10.pdf>)
- Intel Announces the **Mobile Power Initiative and Mobile Power Guidelines** targeted at special considerations for achieving ultimate power efficiency in Mobile PCs.
(<http://developer.intel.com/design/mobile/intelpower/>)
- Industry Status (see below)
- Next Steps (see below)

Technology Description:

The Instantly Available PC is a new way of viewing power management requirements for today's fully featured home or office desktop PC. The goal of the Instantly Available PC is to have a high-performance, feature-rich PC that is power efficient when active and idle, always connected even when "off," and "instantly available" to users whenever needed. The Instantly Available PC is made up of several industry standard ingredients:

- ACPI (Advance Configuration and Power Interface) provides a standard yet flexible interface between hardware and applications to communicate their power management capabilities to the operating system.
- PCI-PM (PCI Power Management) allows add-in cards to participate in the overall power management scheme and introduce a new methodology to the scheme as well.
- Power Supply '98, a Dual Mode Power Supply that will provide clean and intelligent power delivery under both heavy and light loads.
- An ACPI enabled OS will combine the above ingredients to create an intelligent power management platform.

Benefits To Users:

Because of the Instantly Available PC, home users will experience a PC that behaves much like a consumer electronics device. When it is not active, it appears to be off—there is no noise, no heat and very low power consumption. With the ability to be connected to external consumer electronic devices via USB (<http://developer.intel.com/solutions/tech/usb.htm>) and 1394 (<http://developer.intel.com/solutions/tech/1394.htm>) ports, the Instantly Available PC will be the hub of the entertainment center. For example, when you insert your DVD movie, your PC would wake itself up and send the decoded video and audio signals to your ACPI compliant TV and amplifiers after it woke them up too. The Instantly Available PC will deliver a whole new level of usability and robustness, giving us new capabilities for the PC platform touching multiple aspects of everyday life.

For the office PC, the Instantly Available PC has additional benefits with the ability to resume on a LAN event. Intel's Wired for Management initiative (<http://developer.intel.com/solutions/tech/wfm.htm>) specifies remote wake-up policies and procedures to help IT lower the TCO (Total Cost of Ownership). These can be implemented with the Instantly Available PC. No longer will IT managers have to worry about a PC being turned off and unable to get a software update packet at night. Energy savings due to power management are apparent, but your cooling cost throughout the entire campus will be lowered too.

Benefits To Manufacturers:

The Instantly Available PC combines an industry set of standard power management specifications that peripheral vendors and PC OEMs can develop products around. This ensures that all products will correctly work with each other and will be able to fully take advantage of the system power management scheme. By adhering to industry-established standards for power management, PC OEMs and peripheral vendors will not have to bear any additional R&D cost associated with developing an Instantly Available system or peripherals. By broadening the PC platform's capabilities we open the door up for different products that we can connect to the PC and enhance the users' experience.

Industry Status:

Intel, Toshiba*, Microsoft* and many other PC manufacturers are working on bringing ACPI platforms and peripherals to the PC community by the end of 1997. Microsoft has announced that its next versions of Windows* 95 and Windows NT* will be fully ACPI compatible. Most PC and peripheral manufacturers should provide full ACPI implementations by the third quarter of 1998. PCI-PM is now available from the PCI industry special interest group.

On September 29, 1997, Intel hosted a full day Power Management technology training track at the Intel Developer Forum. Attendees received one-on-one access to Intel architects, a complete collateral package of specifications, tools, and design guides necessary to implement an Instantly Available PC. Look for the next Intel Developer Forum in February 1998 (<http://developer.intel.com/design/idf>) for the best training on implementing the hottest technologies driving the PC platform today.

Intel also recently announced the Mobile Power Initiative targeted at achieving power efficiency for Mobile PCs in the 1999 timeframe. Not only has Intel recently announced the Pentium® processor with MMX™ technology at 233MHz to increase performance by 40% and decrease power usage by 50%, it has introduced the Mobile Power Initiative to focus on System Hardware, System Software, and Application Software. The new Mobile Power Guidelines (revision 0.90) are available for download (<http://developer.intel.com/design/mobile/intelpower/>).

Next Steps:

Peripheral Developers and OEMs should become familiar with the key ingredients for the Instantly Available PC. Download and understand the specifications for each. Available now for download at (<http://www.teleport.com/~acpi>) is the specification for ACPI, and the PCI-PM specification is available at (<http://www.pcisig.com/pm10.pdf>). All the other necessary specifications for implementing an Instantly Available PC can be downloaded at Intel's PM spec site (<http://developer.intel.com/ial/powermgm/specs.htm>).

For Mobile PCs, you should become familiar with the Mobile Power Initiative and Mobile Power Guidelines to start designing for ultimate power efficiency in your next designs.

For More Information:

The Instantly Available PC Power Management Design Guide for desktop platforms (<http://developer.intel.com/design/power/pcpower.htm>).

Get the latest Power Supply '98 Dual Mode Power Supply specification (<http://developer.intel.com/design/power/supply98.htm>).

For a closer look at ACPI (<http://www.teleport.com/~acpi>).

A Complete list of downloadable Power Management Specifications for Instantly Available PC (<http://developer.intel.com/ial/powermgm/specs.htm>).

The Mobile Power Initiative and Mobile Power Guidelines designed to increase power efficiency in Mobile PCs (<http://developer.intel.com/design/mobile/intelpower/>).

PC 98 Technology

What's New:

- **PC 98 System Design Guide 1.0**, co-authored by Intel Corporation and Microsoft Corporation*, Available for Download Now!
(<http://developer.intel.com/design/pc98/index.htm> or <http://microsoft.com/hwdev/pc98.htm>)
- Intel provides a day's worth of technical training on implementing PC 98 at the **first Intel Developer Forum (IDF)** on October 1, 1997. To view all of the PC 98 IDF presentations visit Intel's PC 98 web site
(<http://developer.intel.com/design/pc98/#IDF>)
- PC 98: **Keeping the PC Platform Balanced**; Read an overview of three key technology implications of PC 98 by John Hyde, Intel's PC 98 Architect and Design Guide Editor
(<http://developer.intel.com/solutions/archive/issue2/stories/top5.htm>)
- **Leading the Way to PC 98**; Read an overview of PC 98 and Intel's role by Jim Pappas, Director of Platform Initiatives at Intel from Issue 1 of *Platform Solutions*
(<http://developer.intel.com/solutions/archive/issue1/stories/pc98.htm>)
- Industry Status (see below)
- Next Steps (see below)

Technology Description:

The PC 98 System Design Guide describes and recommends how a range of PC platforms should be designed to enhance user experience and satisfaction. PC 98 covers mobile PCs, business and consumer PCs, entertainment PCs and workstations that will ship from mid-1998 through 1999. Hand-held devices running Windows CE* and servers are not included in the PC 98 document. (For information on Server design, check out the new Hardware Design Guide for Windows NT* Server just announced by Intel and Microsoft
(<http://www.intel.com/pressroom/archive/releases/SP110497.HTM>).

The PC 98 System Design Guide is divided into four parts. Part 1 covers upcoming technologies that will be available in the 1998 and 1999 timeframes. Part 2 contains a rigorous description of System Types—most of this section describes a Basic PC 98 from which a Business, Consumer or SOHO (Small Office Home Office) desktop can be derived; two styles of Entertainment PCs, a two-foot viewing experience and a 10-foot viewing experience are described. Mobile design considerations are covered in a separate chapter, as are Workstation design issues. Part 3 describes expansion bus options such as USB, IEEE 1394, PCI, SCSI and other industry specifications. Part 4 details how add-in and add-on devices should be designed; many new technologies and specifications are introduced in this section.

Benefits to Users:

PC 98 describes the introduction of new technologies into PC designs that are becoming more tailored for specific uses in the business and consumer markets. These new technologies and platform designs are intended to increase the utility and ease of use of the PC for different kinds of tasks and offer more choices to businesses and consumers. The overall goal of PC 98 is to address the expanding uses and users of PC technology, and to enhance the user experience and satisfaction.

By writing this document together, Intel and Microsoft are ensuring that the enabling hardware and supporting software will be available at the same time. The lead-time for new hardware designs and for software device drivers is being overlapped to shorten the time to a working, available solution. This up-front cooperation and planning will result in a better user experience.

Benefits to Manufacturers:

Introducing multiple new technologies into the existing PC platform infrastructure could create numerous problems. By working together and with industry experts, Intel and Microsoft have identified a variety of solutions and are creating new industry specifications, or supporting existing industry specifications, to ease rapid and successful absorption of these new technologies. By driving open specifications, Intel can also encourage innovation throughout the multiple PC platform design choices.

Industry Status:

Intel has been a behind-the-scenes contributor on previous versions of the PC 98 design guide. Due to the many projects Intel has on-going to introduce new hardware technologies and increase ease-of-use and end-user satisfaction of PC hardware, Intel's involvement in PC 98 has been growing. It was a natural fit to have Intel co-author with Microsoft on PC 98. Intel and Microsoft have both worked with the industry since February 1997 to review and improve the PC 98 System Design Guide in order to reach a releasable version.

Version 1.0 of the PC 98 System Design Guide was released to the industry in September 1997 and is now available for download from Intel's and Microsoft's web sites at <http://developer.intel.com/design/pc98/index.htm> or <http://microsoft.com/hwdev/pc98.htm>.

On October 1, 1997 at the Intel Developer Forum, Intel hosted a full day technical training for hardware developers on PC 98 implementation. Intel's top architects spoke about three key implications for PC 98 hardware implementation: removal of the ISA Bus, Audio, and Graphics. Microsoft joined Intel at IDF to speak on Driver Quality. To view all of the PC 98 IDF presentations, please visit [Intel's PC 98 web site](http://developer.intel.com/design/pc98/#IDF) (<http://developer.intel.com/design/pc98/#IDF>).

Next Steps:

If you are currently designing PCs or peripherals for shipment after June 1998 and throughout 1999, the PC 98 System Design Guide is a "must-have" reference. It contains definitive information on the evolution of the PC platform, together with essential information for developers. Visit Intel's PC 98 web site for your copy today.

Stay tuned to *Platform Solutions* and the [IDF web site](http://developer.intel.com/design/idf) (<http://developer.intel.com/design/idf>) for information on the next Intel Developer Forum coming in February 1998.

For More Information:

[Intel's developer web site](http://developer.intel.com) also contains detailed design information on all aspects of PC design (<http://developer.intel.com>).

Read an overview of three key technology implications of PC 98 in "[PC 98: Keeping the PC Platform Balanced](http://developer.intel.com/solutions/archive/issue2/stories/top5.htm)," by John Hyde, Intel's PC 98 Architect and Design Guide Editor in Issue 2 of *Platform Solutions* (<http://developer.intel.com/solutions/archive/issue2/stories/top5.htm>).

Read an overview of PC 98 and Intel's role in "[Leading the Way to PC 98](http://developer.intel.com/solutions/archive/issue1/stories/pc98.htm)," by Jim Pappas, Director of Platform Initiatives at Intel from Issue 1 of *Platform Solutions* (<http://developer.intel.com/solutions/archive/issue1/stories/pc98.htm>).

See the other "Platforms" and "Technologies" pages of *Platform Solutions* for the latest news and information on PC technologies found in PC 98 (<http://developer.intel.com/solutions/>).

For information on server platform design, check out the new [Hardware Design Guide for Windows NT* Server](http://www.intel.com/pressroom/archive/releases/SP110497.HTM) just announced by Intel and Microsoft (<http://www.intel.com/pressroom/archive/releases/SP110497.HTM>).

Platform Performance Tuning Technology

What's New:

- Intel **announces platform tools** to help PC OEMs and IHVs shorten development time and improve product performance
(<http://www.intel.com/pressroom/archive/releases/cn92997b.htm>)
- **New Intel Performance Evaluation and Analysis Kit (IPEAK)** web site available
(<http://developer.intel.com/design/ipeak/>)
- Matt Gordon, Intel IHV Ingredient Marketing Manager, fully describes Intel's **new performance tools** in *Platform Solutions*—Issue 2
(<http://developer.intel.com/solutions/archive/issue2/stories/top3.htm>)
- Industry Status (see below)
- Next Steps (see below)

Technology Description:

One of the principal barriers historically confronting PC OEMs and IHVs has been a general lack of performance tuning tools designed to accelerate their hardware development efforts. For the most part, development tools for performance optimization and design analysis are typically developed internally by OEMs and IHVs themselves. In order to accelerate new platform technology adoption and optimize platform performance, Intel is sharing the results of its R&D efforts and making available a new line of development tools, previously used internally by Intel engineers and architects, to the broad PC industry.

At the Intel Developer Forum (IDF) on September 29, Intel announced the new family of performance evaluation and analysis tools called the Intel Performance Evaluation and Analysis Kit (IPEAK) to be available in Q1 1998. IPEAK tools help ease technology adoption and platform performance tuning for PC OEMs and Independent Hardware Vendors (IHVs). As the first offerings of their kind in the industry, the IPEAK tools help shorten product time-to-market cycles when adopting new platform technologies and standards. The tools also provide automated testing solutions that reduce the time spent on testing during the system validation process.

The new IPEAK offerings include the IPEAK Power Management Toolkit, the IPEAK Storage Toolkit and the IPEAK Graphics Toolkit:

- **IPEAK Power Management Toolkit** consists of one tool—the *Power Management Analysis Tool (PMAT)*—developed to help PC OEMs and IHVs incorporate the Advanced Configuration and Power Interface (ACPI) power management initiative into their product design and system integration processes. It also helps to qualify power management functionality, quantify power consumption and test the behavior of applications that incorporate Global System Power Management functionality.
- **IPEAK Storage Toolkit** consists of four tools—*RankDisk*, *AnalyzeDisk*, *Win32 Tracking Kit*, and *AnalyzeTrace*—developed to help vendors identify optimal storage performance at low cost in product designs. In addition, these tools help PC OEMs and IHVs to select the best possible performance storage products at the same price point.
- **IPEAK Graphics Toolkit** includes two tools. The *Graphics Performance Toolkit* provides a better understanding of the performance issues and limitations related to graphics hardware and applications. And the *Baseline AGP System Evaluation Suite* is a system integration and validation tool that provides the capability to test and evaluate AGP system-level functionality and utilization (<http://developer.intel.com/solutions/tech/agp.htm>).

Benefits to Manufacturers:

The new IPEAK toolkits make it easier for OEMs and IHVs to understand performance issues and limitations that can be addressed in the design process to optimize product performance. For example, IHVs can use these tools to detect any performance pitfalls and make corrections while in the pre-production stage, thus lowering the risk of accruing additional costs and delays in their product shipment schedules.

Benefits to Users:

In addition to the benefits they provide for manufacturers, the IPEAK toolkits will help Information Technology (IT) managers to evaluate and select products with increased performance when engaged in system integration activities, or when making decisions related to hardware configuration. Equally significant, the tools benefit users by ensuring that the PCs they purchase have been configured in ways that optimize their performance, functionality and reliability. End- users will be able to fully realize the performance capabilities of new processors, including the Pentium® II processor, combined with new platform technologies.

Industry Status:

In the past, performance and evaluation tools, such as those found in the IPEAK toolkits, have not been generally available. With the introduction of the IPEAK tools at the Intel Developer Forum (IDF), Intel has become the first company to provide these specific kinds of platform performance tuning and integration tools for PC OEMs and IHVs. Intel is currently conducting a beta program for the IPEAK tools. PC OEMs, IHVs, and ISVs are welcome to join the program. IPEAK tools are expected to be available in Q1 1998.

Next Steps:

Intel will be monitoring feedback on the IPEAK tools from users who are part of the beta program. PC OEMs and IHVs can get up to speed on the new IPEAK offerings by accessing information available on the new IPEAK web site, and by continuing to check the status posted on this news page in *Platform Solutions* every month.

If you would like to be considered for the IPEAK beta program and receive pre-release versions of the tools, please send an email to ipeak@intel.com.

Stay tuned to *Platform Solutions* and the IDF web site (<http://developer.intel.com/design/idf>) for information on the next IDF coming in February 1998.

For More Information:

For more details on the IPEAK tools, including screen shots, please check out the new IPEAK web site (<http://developer.intel.com/design/ipeak/>).

Read the Top Story, "Introducing Intel Platform Performance Tools," by Matt Gordon—Intel IHV Ingredient Marketing Manager—in Issue 2 of *Platform Solutions* (<http://developer.intel.com/solutions/archive/issue2/stories/top3.htm>).

For more information on Power Management technologies, please visit the Instantly Available PC technology page in *Platform Solutions* (<http://developer.intel.com/solutions/tech/power.htm>).

For more information on Accelerated Graphics Port (AGP) technology, please visit the AGP technology page in *Platform Solutions* (<http://developer.intel.com/solutions/tech/agp.htm>).

Industry Events:

Intel at Fall Comdex

November 17-20, Las Vegas, NV

Intel will be exhibiting on the main show floor and demonstrating the latest Pentium® II processor platform and technology ingredients for the home, small business, and large business (enterprise) environments. Intel speakers will participate in various panels and sessions. Also, don't miss the Intel BunnyPeople™ performing live at the main show floor. For more information visit Intel's special Comdex web site at <http://www.intel.com/intel/comdex97/index.htm>

Intel at Internet World

December 8-12, 1997, New York, NY

Intel will demonstrate all of the areas supporting the growing Internet application area, from client desktop and servers using Pentium II processors, to software applications to networking solutions. Intel speakers will participate in panels and discussions on the Internet, e-commerce and telephony. For more information visit <http://events.internet.com/fall97.html>

CES, 98

January 8 - 11 , 1998, Las Vegas, NV

Intel will be on hand to demonstrate how the latest Pentium II processor PCs are having an impact on consumer electronics.

Intel Developer Forum

February 17-19, San Jose, CA

Second bi-annual hardware developer event hosted by Intel. This is the premier hardware developer event in the industry. Get implementation tools, detailed training and knowledge directly from Intel's top architects and engineers on the latest technologies driving the PC platform - from the desktop, to mobile and server platforms. To find out what attendees gained at the September IDF, read the Top Stories in Issue 2 of Platform Solutions (<http://developer.intel.com/solutions/archive/index.htm#issue2>). Stay tuned to the *Platform Solutions* newsletter and the IDF web site for more details on the hot technology training tracks to be offered at the February '98 Intel Developer Forum (<http://developer.intel.com/intel/idf>).

Intel Networking Events & Training

For Intel's events and training programs on networking products and technologies, please visit the Intel networking events page at: <http://www.intel.com/network/events/index.htm>

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